FINAL DRAFT

Santa Clara Valley Water District

Urban Water Management Plan 2010

This page intentionally left blank.

2010 URBAN WATER MANAGEMENT PLAN

Table of contents

Sections

Prepared Under the Direction of:
Jim Fiedler
Chief Operating Officer, Water Utility Enterprise

Sandy Oblonsky
Deputy Operating Officer, Water Utility Operations and Maintenance Division

Contributors:
Behzad Ahmadi
Terri Anderson
Hossein Ashktorab
Erin Baker
Jerry de la Piedra
Vanessa de la Piedra
Amy Fowler
Kent Haake
Tracy Hemmeter
Pam John
Barbara Judd
Cindy Kao
Bassam Kassab
Jeannine Larabee
Tracy Ligon
Joan Maher
Jeff Micko
James O'Brien
Miguel Silva
Toni Vye
Ray Wong

Graphic Design:
Joy O. Lim
Michael Sierra, Intern

This page intentionally left blank.

1

2010 URBAN WATER MANAGEMENT PLAN

Chapter 1.0 | Introduction

Urban Water Management Plans (UWMP) are prepared by California's urban water suppliers to support long-term resource planning and to ensure that adequate water supplies are available to meet existing and future water demands. Every urban water supplier that either provides over 3,000 acre-feet of water annually or serves 3,000 or more connections is required to assess the reliability of its water sources over a 20-year planning horizon considering normal, dry, and multiple dry years. UWMPs are required to be submitted to the California Department of Water Resources (DWR) every 5 years. DWR then reviews the submitted plans to make sure the plan satisfies the requirements identified in the Urban Water Management Planning Act (UWMP Act) (Division 6 Part 2.6 of the Water Code §10610 - 10656).

At a ceremony held at the District campus in December 2009, former Governor Arnold Schwarzenegger signed into law a water conservation bill as part of a comprehensive water package to overhaul the state's water system. This package included SBX7 7 which requires a statewide 20% reduction in urban per capita water use by 2020 and requires urban retail water suppliers to adopt year 2015 and 2020 water use targets. Now urban water retail suppliers are required to determine baseline water use and set reduction targets according to specified requirements. Demand projections, including the identified conservation targets, are to be included in water retailers 2010 UWMPs. Water wholesalers, such as the District, are only required to include an assessment of current and future actions to help retail water suppliers achieve their water use targets.

SBX7 7 Signing Ceremony at the District

Usually, UWMPs are due on December 31 of years ending in 0 and 5, but a 6-month extension has been granted for submittal of the 2010 UWMPs to provide additional time for water suppliers to address the SBX7 7 requirements.

The District's 2010 UWMP documents important information on water supply, water usage, recycled water, water use efficiency programs, water shortage planning, water quality and water supply reliability in Santa Clara County. It also serves as a valuable resource for water supply planners and policy makers, and addresses the water supply future of Santa Clara County over the next 25 years. The 2010 UWMP updates and supersedes all previous plans.

1.1 District Overview

The District is an independent special district with jurisdiction throughout Santa Clara County and is the county's primary water resources agency. Figure 1-1 shows the location of Santa Clara County within the State of California. First formed as the Santa Clara Valley Water Conservation District in 1929, the District now acts as the county's principal water wholesaler, flood protection agency and watersheds steward. The District manages groundwater and provides comprehensive water management as authorized by the Santa Clara Valley Water District Act (District Act). The District Act was approved by the California legislature and was incorporated into the California Water Code in Chapter 60 of the Appendix. The complete text of the District Act is included as Appendix B. In accordance with the Act, the Board of Directors adopts policies with related goals and objectives. Polices that pertain to water supply are captured in Board Policy No. E-2. Specifically, the Board's water supply policies are as follows:

2.1 Current and future water supply for municipalities, industries, agriculture and the environment is reliable
2.2 Raw water transmission and distribution assets are managed to ensure efficiency and reliability
2.3 Reliable high quality drinking water is delivered.

The mission of the District is to ensure "a healthy, safe and enhanced quality of living in Santa Clara County

Figure 1-1 Santa Clara County Location Map

through watershed stewardship and the comprehensive management of water resources in a practical, cost effective and environmentally sensitive manner for current and future generations."

The District manages 10 local surface reservoirs, associated creeks, recharge facilities, the county's groundwater basins, and three water treatment plants. The District imports water from the Central Valley Project and the State Water Project and delivers recycled water to parts of the county. The District supplies water to local water retail agencies which in turn provide it to their customers in Santa Clara County.

1.2 UWMP Content and Organization

The 2010 UWMP brings together important information on water resources management in Santa Clara County. It is designed to present information in a format that will be useful to land use planning agencies, cities, water retailers, and community members who are interested in understanding water supply issues in Santa Clara County.

In addition, this report was organized to address the UWMP Act requirements and facilitate review by DWR. The UWMP Act is included in Appendix C. The Guidebook to Assist Urban Water Suppliers to Prepare a 2010 Urban Water Management Plan (2010 Guidebook) was developed by DWR to assist urban water suppliers in complying with requirements of the UWMP Act and the Water Conservation Bill of 2009.

Included in the 2010 Guidebook is the DWR checklist which was developed directly from the UWMP Act and the Water Conservation Bill of 2009. A completed checklist with references to particular chapters and page numbers where related information can be found in this document is included as Appendix D. Also included in Appendix D are additional tables with information not included in the plan itself but has been provided to facilitate plan review by DWR.

The District's 2010 UWMP includes the following chapters per the DWR Guidebook.

Chapter 1 Introduction: This chapter describes the organization of the 2010 UWMP, background related to plan preparation, stakeholder involvement and the coordination with key stakeholders. (Water Code §10617, §10620, §10621(b), §10640, §10641, §10642, §10643, §10645, §10653)

Chapter 2 Service Area and Water Supply System: This chapter describes the climate, demographics and economy of Santa Clara County and provides a general discussion on the history of Santa Clara Valley Water District and an overview of the water supply system. (Water Code § 10630, § 10631)

Chapter 3 Water Supply: This chapter provides more detailed information on each of the water supply sources including groundwater, local surface water, imported water (including water transfer and exchanges) and efforts related to desalination. (Water Code §10631)

Chapter 4 Water Use and Demand Projections: This chapter provides information on historical water use including use by sector, information on demand projections and the method used to develop these projections. (Water Code §10631)

Chapter 5 Demand Management Measures: This chapter describes the cooperative partnership in the regional implementation of a variety of water conservation programs in an effort to permanently reduce water usage in Santa Clara County. (Water Code §10631, §10631.5)

Chapter 6 Water Shortage Contingency Planning: This chapter describes the development, actions and implementation of the District's water shortage contingency plan. In addition, information is provided on the three dry year scenario, mandatory prohibitions, penalties or charges for excessive use, revenue and expenditure impacts, mechanisms to determine reductions in water use and catastrophic interruption planning. (Water Code §10632)

Chapter 7 Water Recycling: This chapter provides a description of the water recycling systems within Santa Clara County, current and projected wastewater quantity and quality, current recycled water use and discusses potential and projected uses of recycled water. (Water Code §10633)

Chapter 8 Water Quality: This chapter provides general information on water quality. (Water Code §10631, §10634)

Chapter 9 Addressing Threats to Supply Reliability: This chapter provides general information related to potential threats to water supply reliability and describes District efforts to address these threats, uncertainties and risk. (Water Code §10631, §10634)

Chapter 10 Water Supply Reliability (Supply and Demand Comparison): This chapter examines the water supply outlook in Santa Clara County under different hydrologic conditions. Specifically, supply and demand comparisons in five year increments to 2035 under normal, dry year and multiple dry year conditions are presented. (Water Code §10635)

1.3 Stakeholder Involvement

1.3.1 Agency Coordination

The 13 major water retailers in Santa Clara County are the primary stakeholders involved in the preparation of this plan. Coordination with water retailers was performed primarily through the Water Supply Subcommittee of the District's Water Retailer Committee and meetings with individual retailers and planning agencies as required. As early as January 2009, District staff began to discuss the preparation of the 2010 UWMP with water retail agencies. A list of retailer meetings and subcommittee meetings on the 2010 UWMP is provided in Table 1-1.

Table 1-1 Water Retailer Meeting Summary

Water Supply Subcommittee	Groundwater Subcommittee	Recycled Water Subcommittee	Water Conservation Subcommittee	Water Retailer Meeting
February 19, 2009 June 10, 2009 November 18, 2009 January 13, 2010[1] August 4, 2010 November 17, 2010 March 23, 2011	March 5, 2009	February 23, 2011	January 13, 2010[1] January 20, 2011	March 11, 2009 January 21, 2010 March 16, 2011
Notes: (1) Joint Meeting				

During stakeholder meetings with water retailers, items discussed were; water management issues, water use data, water use assumptions, growth projections and water shortage contingency planning. Other stakeholder communication included phone conversations and email exchanges. A link to the draft plan was provided to retailers in April 2011 to facilitate discussion and obtain retailer feedback and comments on the plan.

Staff presented information on the development of the UWMP to the Santa Clara County Association of Planning Officials. District staff also met with representatives of land use planning agencies to discuss growth projections and water supply issues associated with new growth and development. All cities within the county and the County of Santa Clara were notified by letter at least 60 days prior to the public hearing that the District is in the process of updating the UWMP and all retailers were notified by email.

The water retailers and land use planning agencies that the District coordinated with are summarized in Table 1-2. In addition, information sharing and coordination took place with the San Francisco Public Utilities Commission and the Bay Area Water Supply and Conservation Agency.

Table 1-2 Water Retailers and Planning Agencies

Water Retailers	Planning Agencies
California Water Service Company	Santa Clara County Planning
Gilroy Water	Campbell Town Planning
Great Oaks Water Company	City of San José Planning
Milpitas Water	Cupertino City Planning
Morgan Hill Water	Gilroy City Planning
Mountain View Water	Los Altos City Planning
Palo Alto Water	Los Gatos Town Planning
Purissima Hills Water District	Milpitas City Planning
San José Municipal Water System	Monte Sereno City Planning
San Jose Water Company	Morgan Hill City Planning
Santa Clara Water Department	Mountain View City Planning
Stanford University, Utilities Division	Palo Alto City Planning
Sunnyvale Water	Santa Clara City Planning
	Saratoga Town City Planning
	Stanford University
	Sunnyvale City Planning

1.3.2 Board Advisory Committees

The board of directors has established nine advisory committees to assist in developing and recommending policies that guide District operations. Advisory committees pertinent to the development of the 2010 UWMP include the Water Commission, the Agricultural Water Advisory Committee and the Landscape Advisory Committee. A brief description of each of these committees is provided below.

The Santa Clara Valley Water Commission assists the District board in developing and recommending policies for water supply, water quality, and in the annual review of groundwater charges.

The Agricultural Water Advisory Committee assists the District board in developing and recommending policies regarding water supply for agricultural uses.

The Landscape Advisory Committee assists the District board in developing and recommending policies for water conservation and providing a link between the Santa Clara County's landscape industry and the board.

Information on the development of the UWMP was presented at the Water Commission, Agricultural Water, and Landscape Board Advisory Committee meetings in October 2010. In response to a request of the Water Commission to the Board, information on water shortage actions and consistency among the cities and county was presented on January 26, 2010.

1.3.3 Public Involvement

The District actively encouraged public involvement and participation in the development of the 2010 UWMP. Information on the development of the 2010 UWMP was made available on the District's external website beginning in January 2010. Drafts versions of various chapters were provided upon request starting in January 2011.

In addition, staff provided information related to the 2010 UWMP to the District's Water Resources Stakeholder Review Committee (SRC) on January 24, 2011 and April 18, 2011. The SRC is an advisory committee comprised of representatives from cities, the county, retailers, advocacy groups, and other organizations such as the Santa Clara Valley Audubon Society, Santa Clara County Farm Bureau, and Silicon Valley Leadership Group. The purpose of the SRC is to provide input and receive information from staff on District long-term water resource planning projects.

Information related to the preparation of the District's 2010 UWMP was presented to the District Board at the January 25, 2011 Board meeting. In addition, the resolution setting the time and place of a public hearing for April 12, 2011 was adopted by the Board on February 8, 2011. The public hearing for the 2010 UWMP was opened at the April 12, 2011 Board meeting and closed at the May 24, 2011 Board meeting. The 2010 UWMP was modified as appropriate to address comments received from the public, various agencies, and water retailers and was adopted by the Board on (date - TBD). The resolution adopting the District's 2010 UWMP is included as Appendix A. The District will implement the 2010 UWMP in accordance with the schedule included in the plan.

Notices regarding the public hearing were provided in local newspapers serving the north and south portions of Santa Clara County. On April 6, 2011, the draft 2010 UWMP was posted on the District's website and a hard copy was made available at the District office for public inspection and review. On [date – TBD] the final draft 2010 UWMP was posted on the District's website and a hard copy was available at the District office for public inspection and review.

2 2010 URBAN WATER MANAGEMENT PLAN

Chapter 2.0 | Service Area and Water Supply System

This chapter describes the climate, demographics and economy of Santa Clara County and provides a general discussion of the history of Santa Clara Valley Water District and an overview of the water supply system. This type of information is useful in developing demand projection and supports the water supply Board policy goal that "current and future water supply for municipalities, industries, agriculture and the environment is reliable". Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist items 8 through 12.

2.1 Demographic factors

2.1.1 Population and Household Projections

The demographic projections for Santa Clara County from the Association of Bay Area Governments Projections 2009 (ABAG Projections 2009) are summarized in Table 2-1. Based on data from the California Department of Finance, the total county population in the year 2000 was 1,682,585. ABAG Projections 2009 estimate that the county population will rise to 2,431,400 by the year 2035, almost a 45 percent increase. San José, the largest city in the county, recently ranked as the tenth largest city in the nation with an estimated population of 1,023,000. By 2035, San José's share of the county's population is expected to increase to 59 percent from a current share of 56 percent. ABAG Projections 2009 estimates that the county will add almost 260,000 new households, from 565,860 in 2000 to 827,330 by 2035. The number of persons per household is expected to continue to be higher than the historical average, and an increasing number of those employed here will not be residents of the county.

Table 2-1 Santa Clara County Demographics from ABAG Projections 2009

	Year							
	2000 (actual)	2005 (actual)	2010	2015	2020	2025	2030	2035
Total Jobs	1,044,130	872,860	906,270	981,230	1,071,980	1,177,520	1,292,490	1,412,620
Population	1,682,590	1,763,000	1,822,000	1,945,300	2,063,100	2,185,800	2,310,800	2,431,400
Household Population	1,652,870	1,732,900	1,791,100	1,914,100	2,031,600	2,154,300	2,279,300	2,399,900
Households	565,860	595,700	614,000	653,810	696,530	739,820	785,090	827,330
Persons Per Household	2.92	2.91	2.92	2.93	2.92	2.91	2.90	2.90
Employed Residents	863,430	734,000	815,800	899,900	985,400	1,074,500	1,164,500	1,252,500
Mean Household Income	$118,400	$97,900	$108,700	$114,600	$120,900	$127,600	$134,600	$142,000

Figure 2-1 and Figure 2-2 compare the population projections and household projections, respectively, based on ABAG Projections 2009 and ABAG Projections 2005.

Figure 2-1 Santa Clara County Projected Population

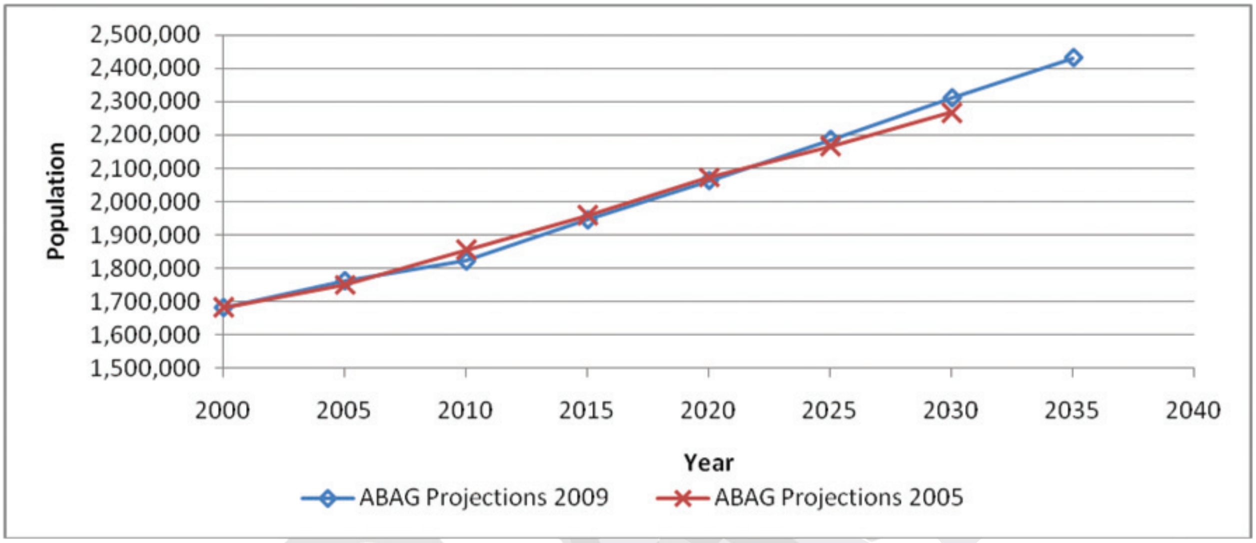
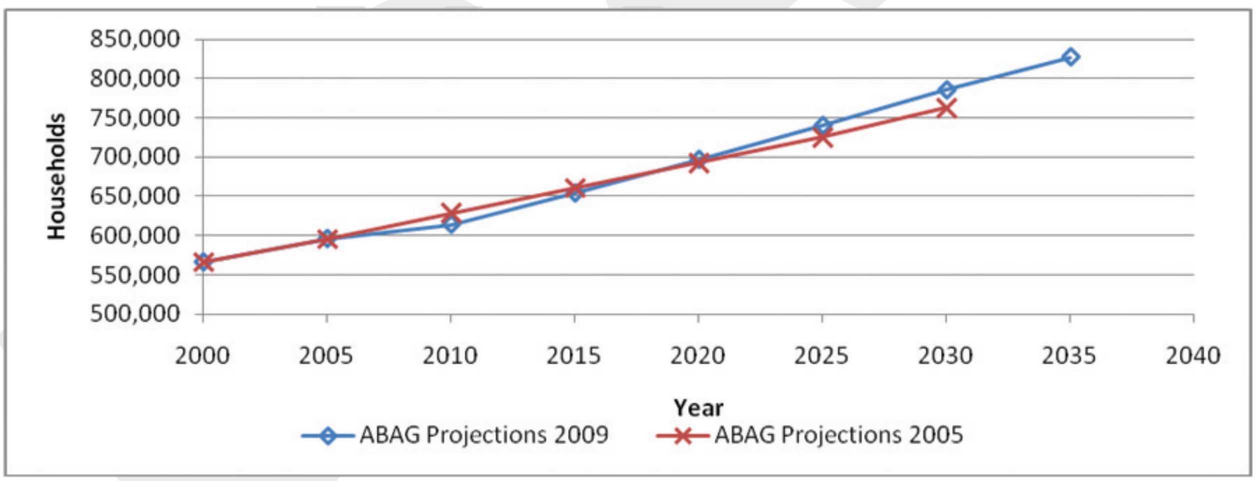


Figure 2-2 Santa Clara County Projected Households

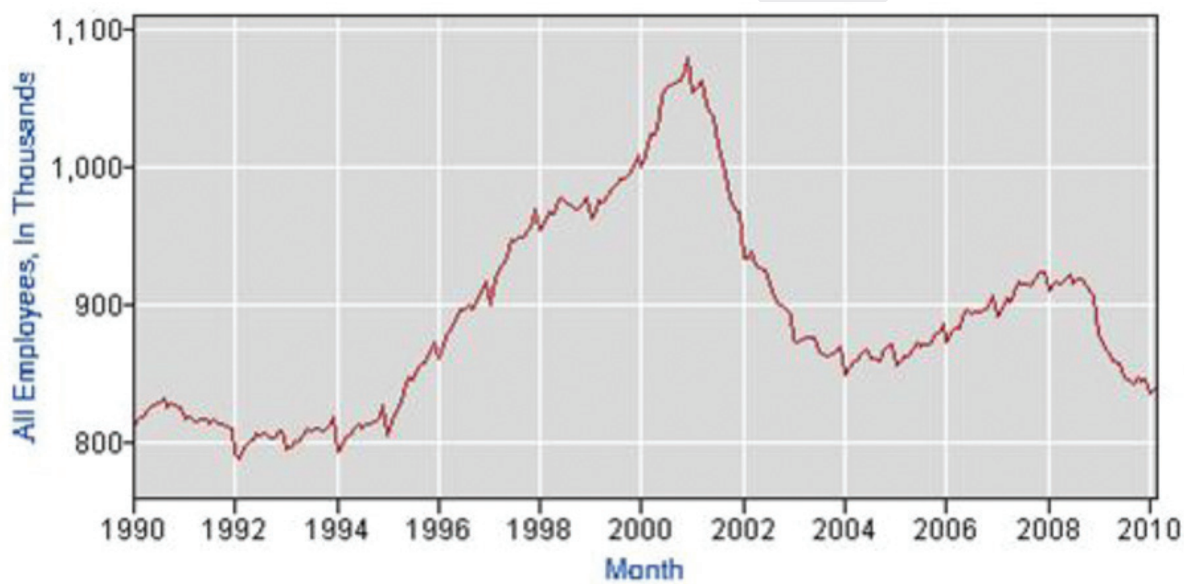


The figures show that the population and household projections for the most recent ABAG Projections 2009 are slightly lower in the near term (2010-15), essentially the same in the medium term (2020) and are slighter greater in the long term (2030) when compared to ABAG Projections 2005.

2.1.2 Economic Projections

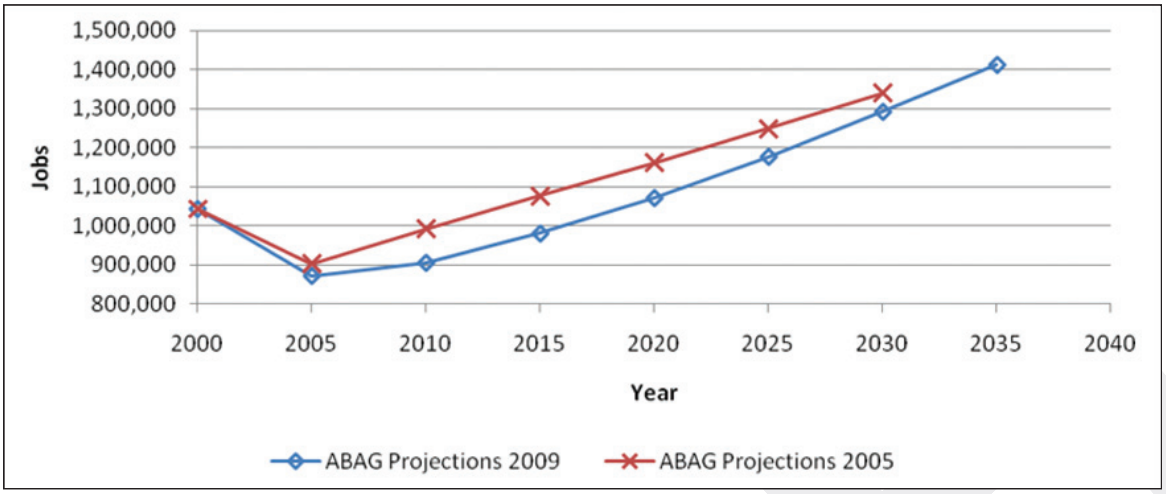
Santa Clara County is home to a very dynamic economy and more than 1.8 million people. Urbanization has replaced the orchards of North County over the past several decades, while agriculture remains an important part of the South County area. The county's economy is a key element in the Northern California Bay Area, providing almost 30 percent of all the jobs in the region. Nicknamed "Silicon Valley," historically about one out of every five jobs in the county is in high technology. The economic recession over the last few years has led to a loss of jobs, particularly in the manufacturing, housing, and technology sectors. The job losses are most pronounced in the manufacturing and financial/professional/retail services. Figure 2-3 shows total non-farm employment for the San Jose-Sunnyvale-Santa Clara Metropolitan Statistical Area from 1990 through the beginning of 2010 from the U.S. Department of Labor Bureau of Labor Statistics.

Figure 2-3 Total non-farm Employment for the San Jose-Sunnyvale-Santa Clara Metropolitan Statistical Area



According to ABAG Projections 2009, the long-term trend for the county's economy is expected to become more stable with slow job recovery through 2020. Health, education and recreational job sectors are expected to grow the most. ABAG began using Smart Growth (Urban Densification) principals in the 2003 projections. According to ABAG, smart growth policies will result in core growth in the urban Santa Clara County as planned interconnecting transit systems become a reality. Significant job growth is expected in the years 2015 to 2030. Figure 2-4 shows projected jobs for Santa Clara County based on ABAG Projections 2009 and 2005. The graph shows that jobs will increase more slowly than previously estimated with fewer total jobs projected in 2030.

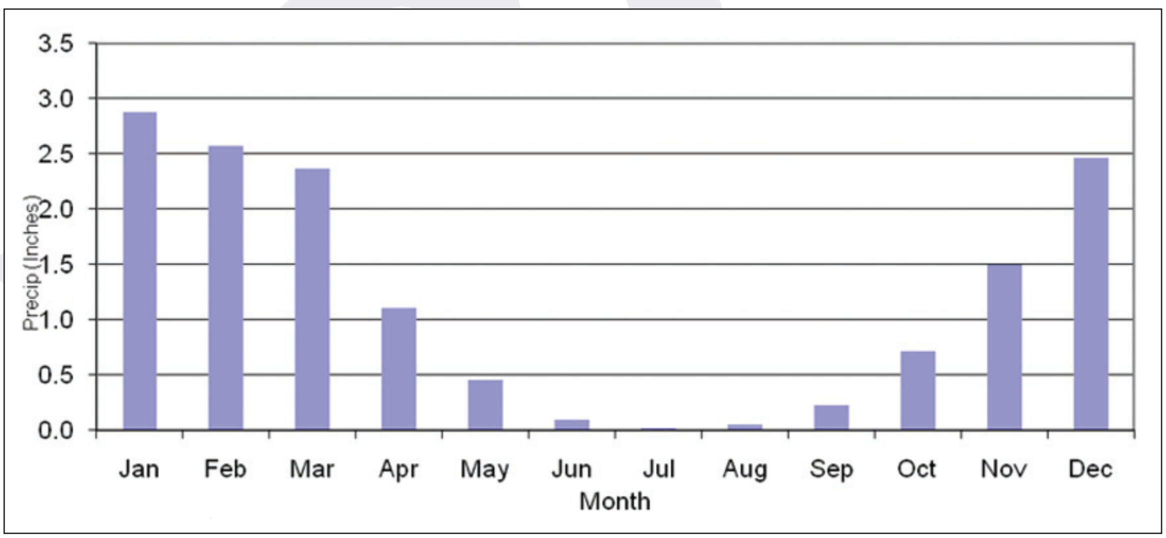
Figure 2-4 Santa Clara County Projected Jobs



2.2 Climate Characteristics

The county's Mediterranean semi-arid climate is temperate year-round, with warm and dry weather lasting from late spring through early fall. Average annual precipitation ranges from 14.5 inches on the valley floor to 45 inches along the crest of the Santa Cruz Mountains. As shown in Figure 2-5, most precipitation occurs between the months of November and April.

Figure 2-5 Average Monthly Rainfall San José Gauge 131 (86), (1874-2009)



The county's temperature is generally moderate; the average maximum annual temperature for San José is 71°F, the average minimum annual temperature is 49.5°F; and average annual evapotranspiration (ETo) is 42.0 inches. Based on the 136 years of recorded rainfall in the county, the average annual rainfall in downtown San José is about 14.5 inches and ranges from a low of 4.8 inches to a high of over 30 inches.

Figure 2-6 shows the variability in historical rainfall that has occurred in downtown San José. During very wet years like 1983, in which 32.5 inches of rain fell and generated more water supply than could be put to beneficial use, the excess water created flooding in the county and was lost to the Bay. But in very dry years such as 1976, when only 5.77 inches of rain fell, the water supply generated was extremely low and did not produce enough water to meet demands.

Figure 2-6 Historical Annual Rainfall – San José Gauge 86 (1874-2009)

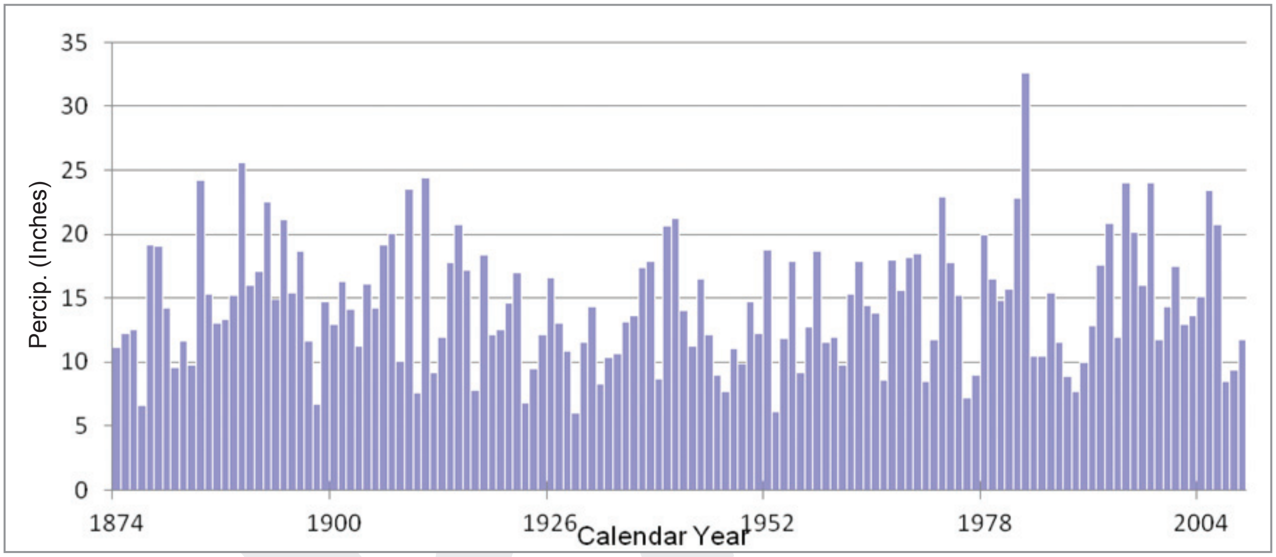


Table 2-2 provides climate data for a weather station in San José, representing the center of the county.

Table 2-2 Historical Average Monthly Climate Data

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Standard Monthly Average ETo (inches)(1)	0.9	1.4	2.4	3.7	4.9	6.2	6.5	5.8	4.2	2.8	1.3	0.9	42.0
Average Rainfall (inches)(2)	2.9	2.6	2.4	1.1	0.5	0.1	0.0	0.0	0.2	0.7	1.5	2.5	14.5
Average Temperature (°F)(3)	49.9	53.2	55.6	58.8	62.9	67.1	69.6	69.4	68.4	63.3	55.6	50.0	60.4

Notes:

(1) SCVWD Alamitos Station, evaporation record 1959 - 2009

(2) San Jose, District Alert System, Station 131 (86) downtown, period of record 1847 - 2009

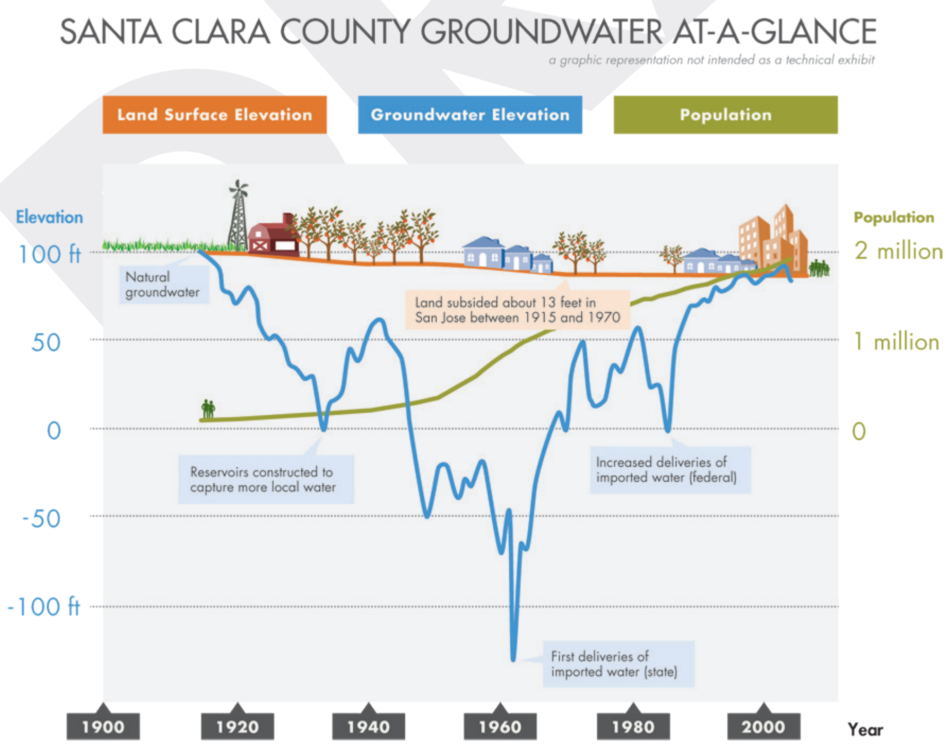
(3) National Weather Service, data period of record 7/1948 to 7/2006

2.3 History

Calero Dam Construction (1935)

In the late 1920s over pumping and significant land surface subsidence (totaling approximately 13 feet in San José) led to the formation of the District as the county's groundwater management agency. The first function of the District in 1929 was to develop a reliable water supply by building reservoirs to store water and to recharge the underground aquifer to halt subsidence. As the valley's population and economy grew, so did the need for more water. In response, the District constructed several dams in the 1930's and again in the 1950's to impound winter waters for recharge into percolation facilities.

Figure 2-7 History of Groundwater Elevations in the Santa Clara



The 1950s were a period of rapid growth for the county, with the population doubling between 1950 and 1960. To supply this growth, groundwater pumping continued to increase and groundwater levels continued to decline. In 1952, the first imported water was delivered to the county through the San Francisco Public Utilities Commission (SFPUC) Hetch-Hetchy system. By the early 1960s it was evident that the combination of SFPUC-imported supplies and local water supplies could not meet the water demands of the growing county. Figure 2-7 presents a graphic representation of the groundwater elevation and population over time.

Raising the girders at Anderson Dam (1951)

In 1965, the District began receiving deliveries of water imported from the California Department of Water Resources (DWR) State Water Project (SWP) through the South Bay Aqueduct. The District also began building water treatment plants to treat a portion of the imported water to reduce the need for groundwater pumping. In 1967, the District started delivering treated water to residents in the north western part of the county from the Rinconada Water Treatment Plant in Los Gatos. Penitencia Water Treatment Plant came online in 1974. With the addition of the SWP imported water and the water treatment plants to treat it, groundwater levels recovered and the rate of subsidence significantly slowed. By the mid-1980s, groundwater pumping accounted for just half of the total water use in the county and the rate of subsidence was reduced to about 0.01 feet per year.

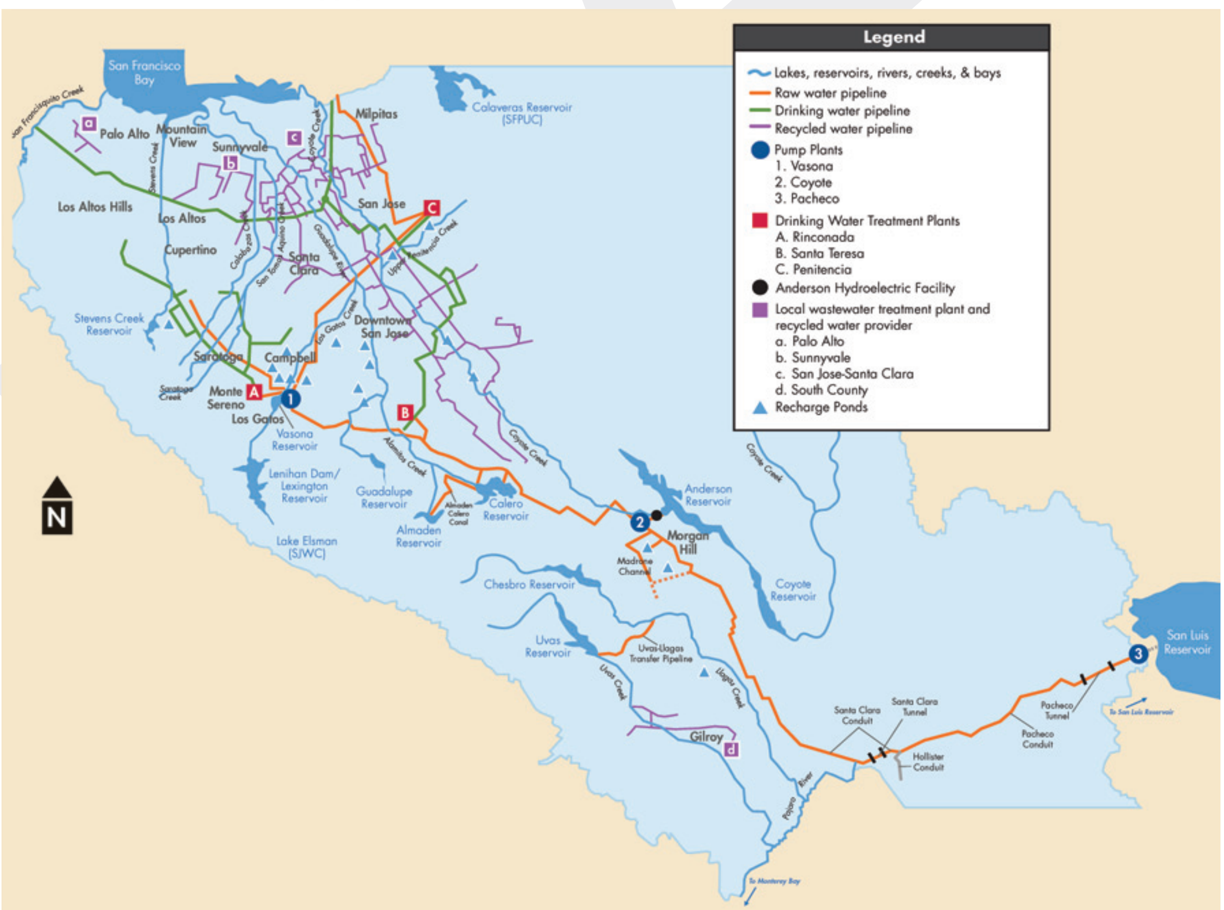
Even as the SWP was brought on line, it became apparent that additional imported water was needed to ensure a reliable future water supply for the county. In 1967, the federal San Felipe Division was authorized by Congress to bring Central Valley Project water to Santa Clara and San Benito Counties. In 1977, the District signed a long-term water service contract with the United States Bureau of Reclamation, and in 1987, facilities were completed to provide the first federal water deliveries. The Santa Teresa Water Treatment Plant began operations in 1989, giving the District the ability to fully utilize this additional source of imported water.

In the early 1990s, local wastewater agencies increased the use of recycled water by adding advanced treatment capabilities. Per the guidelines of state and county health departments, appropriately treated recycled water is suitable for park land, school yard, and landscape irrigation, including residential lawns. The South Bay Water Recycling Project began in 1995 with the cities of San José, Santa Clara and Milpitas funding the construction of 100 miles of pipeline in a 30 square mile area within their jurisdictions.

2.4 Water Supply System

The District's water supply system is comprised of storage, conveyance, recharge, treatment and distribution facilities that include local reservoirs, the groundwater basin, groundwater recharge facilities, treatment plants, imported supply, and raw and treated water conveyance facilities. Figure 2-8 shows the District's raw water and treated water conveyance system, treatment facilities, reservoirs, and recharge facilities.

Figure 2-8 District Water Supply Facilities

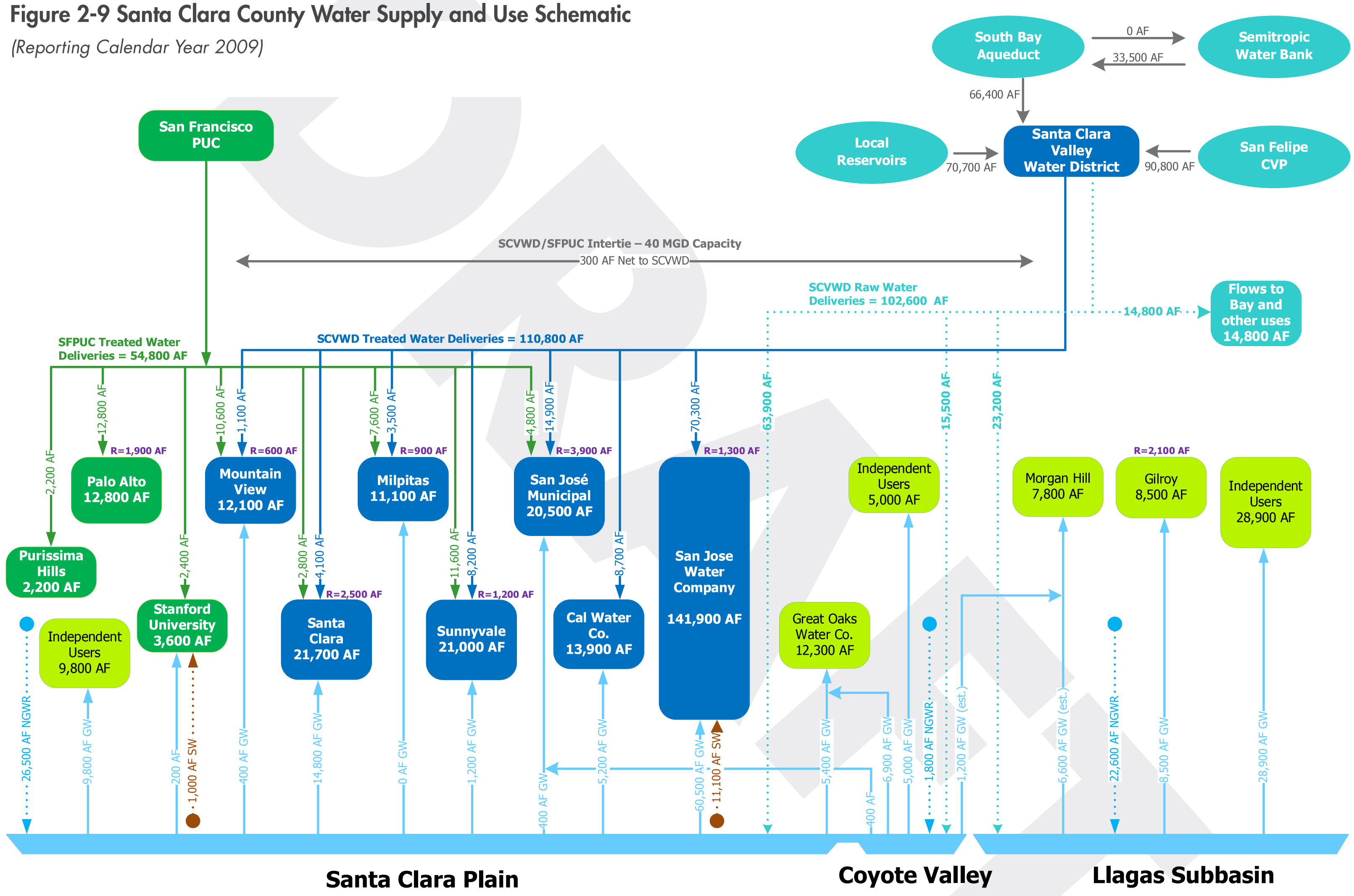


The District has been a leader in conjunctive use in California for decades, utilizing imported and local surface water to supplement groundwater and to maintain reliability in dry years. Conjunctive use helps protect local subbasins from overdraft, land subsidence, and saltwater intrusion and provides critical groundwater storage reserves for use during droughts or outages. The District has three water treatment plants, Rinconada, Penitencia and Santa Teresa which can sustain a maximum flow rate of 80 MGD, 40 MGD, and 100 MGD, respectively. Surface water treated for distribution reduces direct demands on groundwater.

Since 1989, (when the last of the three District water treatment plants came on line) the District's various sources of water have remained relatively constant as a percentage of total supply. Groundwater represents the biggest share of total use, ranging from approximately 40 to 50 percent of total water use. Treated water represents the second largest share, from 30 to 38 percent of total water use. SFPUC supplies (from the Hetch-Hetchy system) represent the third largest share, ranging from 16 to 19 percent of total water use. Other sources include recycled water (approximately 5 percent) and other non-District local surface water (approximately 4-5 percent). The District supplies water to local retail water agencies which in turn provide it to their retail customers in Santa Clara County. The District also manages the groundwater basin to the benefit of agricultural users and individual well owners who pump groundwater. Supply sources by retailer for calendar year 2009 is shown in Figure 2-9.

Figure 2-9 Santa Clara County Water Supply and Use Schematic

(Reporting Calendar Year 2009)



Note: All water qualities rounded to nearest 100 AF.
Water deliveries based on SCVWD & SFPUC records.
Recycled water based on retailer reporting.
Inter-basin exchanges are not shown.

LEGEND:
Raw Water Deliveries
Groundwater (GW) Pumping
SFPUC Treated Water Deliveries
Natural Groundwater Recharge (NGWR XXXX)
SCVWD Treated Water Deliveries
SW = Surface Water
R= Recycled Water

3 2010 URBAN WATER MANAGEMENT PLAN

Chapter 3.0 | Water Supply Sources

This chapter provides more detailed information on each of the water supply sources including local surface water, groundwater, imported water (including water transfers and exchanges), and efforts related to desalination. Water recycling is covered in detail in Chapter 7. The projected total supplies, consisting of the individual supplies described in this chapter, are summarized in Chapter 10.

The District's water supply system is comprised of storage, conveyance, recharge, treatment, and distribution facilities that include local reservoirs, the groundwater basin, out-of-county groundwater banking (Semitropic), groundwater recharge facilities, treatment plants, imported supply, and raw and treated water conveyance facilities. A general overview of the District water supply system and a brief history of the District are included in Chapter 2.

Information in this chapter is intended to satisfy the requirements related to DWR 2010 UWMP Checklist items 5, 14 through 21, 24, 30, and 31.

3.1 Water Supply Strategy

The District recharges the groundwater basins to store water locally and to protect against drought or emergency outages. This strategy allows the District to store surplus water in the groundwater basins and enables part of the county's supply to be carried over from wet years to dry years. In addition, the District routinely opts to carry over a portion of its imported water supplies from one contract year to the next. Even though the amount is often limited by state or federal project operators, it provides cost-effective insurance against a subsequent dry year. The District also has an out-of-county banking program with the Semitropic Water Storage District. The District can send certain defined amounts of excess import supply to the bank in wet years and then make arrangements to receive certain defined amounts back (through the SWP conveyance system) in dry years when it is needed.

Managing water supply to provide a reliable source of water requires complex analyses incorporating multiple sources of water of varying hydrology and availability. This must be accomplished utilizing available facilities to meet a range of uses, while accommodating regulatory constraints and institutional issues. The District's Operation Plan provides projections of how District-managed water (locally-conserved and imported water) will be distributed to efficiently use recharge facilities and provide treated water to meet demands.

Camden Groundwater Recharge Ponds

The District operates and maintains 18 major recharge systems, which consist of both in-stream and off-stream facilities. Most of the local supply is recharged into the groundwater basin, either through natural stream channels, through canals, or through in-stream and off-stream ponds. In addition, imported water is delivered by the raw water conveyance system to streams and ponds for the District-managed groundwater recharge program.

Table 3-1 summarizes the general water supply management programs performed by the District.

Table 3-1 Water Supply Management Programs

Program	Brief Description
Water Supply Operations Planning	Operations planning includes analyzing water supply conditions, developing water supply operations strategies, and coordinating schedules for imported and local water utilization in treatment plants and in recharge facilities.
Local Water Supply Operations	This program includes monitoring, as well as reporting and managing reservoir inflow, yield, capacity and other data. This program also includes development and maintenance of operations models and operations analysis software.
Water Rights	Activities performed in this project include determining annual appropriations of local water, monitoring and reporting water rights appropriations, and compliance with terms and conditions of water rights licenses to the State Water Resource Control Board.
Recharge and Raw Water Field Facility Operations	This program provides for operating groundwater recharge and other raw water facilities, to process local and imported water supplies for recharge of the counties two major groundwater subbasins. Activities include daily monitoring and regulation of flows and inspection of facilities, operation of diversion facilities and capacity restoration at percolation ponds (pond cleaning).
Recharge and Raw Water Field Facility Maintenance and Asset Management	This comprehensive program includes development and management of asset inventory, condition standards, best management practices, good neighbor practices, maintenance manuals, records drawing management system, preventive and corrective maintenance programs, work order management processes and work tracking systems, facility histories, long term cost projection methods for replacement and restoration of facilities, regulatory reporting and compliance plans, and performance metrics.
Hydrologic Data Collection and Management	The program includes collecting and analyzing hydrologic data (precipitation, stream flow, reservoir inflows, evaporation, and general weather related data), operation and maintenance of 43 rainfall stations, 70 stream flow and stream stage stations, and 11 reservoir stations. This program also manages the ALERT program which provides real time data from most stations to be displayed on the District's internet website.
Water Supply Accounting	This program prepares a reconciliation of all the water supply distribution and flow data, and collects data from the hydrologic data management program, the raw water distribution system, recharge and raw water field facility operations, treated water operations, imported water operations and untreated surface water management.

3.2 Local Surface Water

The District works to sustain local water supplies and infrastructure by maintaining local water rights and protecting streams, fisheries, and natural habitat. The District has numerous water rights to divert and store water from local creeks and streams.

3.2.1 District Reservoirs

Local runoff is captured in local reservoirs for recharge into the groundwater basin or treatment at District's water treatment plants. The total storage capacity of the District reservoirs is about 170,000 AF (without Department of Safety of Dams (DSOD) restrictions) Water stored in District reservoirs provides up to 25 percent of Santa Clara County's water supply. Reservoir operations are coordinated with imported water conveyed through the Delta and delivered to the District by the State Water Project (SWP) and the federal Central Valley Project (CVP). Table 3-2 lists reservoir capacities and use.

Anderson Reservoir

Table 3-2 District Reservoirs

Reservoir	Year Completed	Reservoir Capacity (acre-feet)(1)	Restricted Capacity (acre-feet)	Use
Almaden(2)	1935	1,586	1,260	Recharge & treated
Anderson(2)	1950	90,373	51,250	Recharge & treated
Calero(2)	1935	9,934	5,671	Recharge & treated
Chesbro	1955	7,945	7,945	Recharge
Coyote(2)	1936	23,244	12,382	Recharge & treated
Guadalupe(2)	1935	3,415	2,738	Recharge
Lexington	1952	19,044	19,044	Recharge
Stevens Creek	1935	3,138	3,138	Recharge
Uvas	1957	9,835	9,835	Recharge
Vasona	1935	495	495	Recharge
Total		169,009	113,758	

Notes:
(1) Reservoir capacities based on most recent surveys and storage at spillway
(2) Restricted capacity per Department of Safety of Dams interim operating restrictions.

Most of the local reservoirs were sized for annual operations, storing water in winter for release to groundwater recharge in summer and fall. The exception is the Anderson-Coyote reservoir system, which provides valuable carryover of supplies from year to year and can serve as a backup supply source to the District's water treatment plants when imported water deliveries are curtailed. Department of Safety of Dams (DSOD) interim operating restrictions placed on Anderson, Coyote, Almaden, Calero and Guadalupe reservoirs has resulted in a loss of storage capacity and water supply yield.

The management of stored water is adjusted as seasonal conditions change. Most stored water is released in the spring after the rainfall season and allowed to percolate into the underground aquifers, or it is sent to District treatment plants. Reservoirs typically fall to their lowest levels in the late fall, but rarely are empty. To protect fish habitat, minimum water levels have been established. Several factors that can impact the District's reservoir operations and its use of surface water rights include maintaining storage levels for environmental or recreation purposes, dam safety requirements, and managing total District supplies for reliability. Existing recharge capability can also be a limiting factor in the District's ability to fully utilize its surface water supplies.

3.2.1.1 Flood Control Rule Curves

The District's local reservoirs were built as water supply facilities. However, reservoir operating rules have been established at all District reservoirs to reduce flooding to the extent that the impact on their water supply function will be minimal. These strategies recognize that if the reservoir storage approaches full early enough in the rainfall season some stored water will be released to create increased flood storage capacity without significantly reducing the probability of filling the reservoir by the end of the season.

Vasona Dam

Operating reservoirs with rule curves to provide flood storage and to minimize limiting factors for salmonid habitat require a significant facility management effort. Storage levels and release rates must be continuously monitored and evaluated to ensure compliance with the operational strategies and to avoid aggravating or compounding downstream problems. The flood control program uses National Weather Service Quantitative Precipitation Forecasts to predict flow rates in the uncontrolled watershed downstream of the reservoirs and releases are discontinued when predicted flow rates exceed a safe level. Since 1969, Anderson and Coyote reservoirs have been operated to reduce flood probabilities as part of the Coyote Creek flood protection design. In 1982 the District modified operating strategies for Anderson and Coyote to reduce flood probability while minimizing impact to water supply. In 1997 the District implemented similar operating strategies for the remaining reservoirs (excluding Vasona) that seek to reduce flood probability without impact to water supply. Unlike Anderson and Coyote, the reservoir operating strategies adopted in 1997 are not associated with flood management projects.

3.2.2 Non-District Local Surface Supplies

Other agencies in the county also develop water locally. The San José Water Company (SJWC) and Stanford University both hold surface water rights. SJWC has developed an estimated average yield of 12,500 AF from diversions and storage in the Upper Los Gatos Creek watershed and a run-of-the-river treatment facility on Saratoga Creek. These supplies are part of the total local surface water supply available to the county.

3.3 Groundwater

Managing groundwater is the reason the District was formed and it remains one of the District's most important missions. Local groundwater resources make up the foundation of District water supply, but these need to be augmented by imported water and the District's comprehensive water supply management activities in order to reliably meet the needs of county residents, businesses, agriculture, and the environment. While reservoirs are a visible indicator of the District's local water supply, the majority of local and imported water reserves lie hidden in the groundwater aquifers that underlie Santa Clara County. The groundwater basins perform multiple functions including transmission, filtration, and storage. Eventually the groundwater reaches pumping zones, where it is extracted for municipal, industrial, and agricultural uses. Groundwater pumping provides up to half of the county's water supply during normal years. In South County groundwater pumping provides more than 95 percent of supply for all beneficial uses and 100 percent of the drinking water supply.

Groundwater is replenished naturally from rainfall and augmented by the District-operated recharge program utilizing both local and imported water. Conjunctive use, which is the practice of storing surface water in a groundwater basin in wet years and withdrawing it from the basin in dry years, helps protect local subbasins from overdraft, land subsidence, and saltwater intrusion.

3.3.1 Groundwater Management

Groundwater management encompasses activities and programs that replenish and recharge groundwater supplies, prevent groundwater overdraft and land subsidence, sustain storage reserves, evaluate groundwater quality and potential threats, and implement groundwater protection measures to help assure the long-term viability of groundwater resources.

With regard to groundwater management, the District Act (see Appendix B) authorizes the District to do the following:

- Provide for the conservation and management of waters from any sources within or outside the watershed for beneficial and useful purposes, including the percolation of waters into the soil within the District (Section 5.6).
- Store water in surface or underground reservoirs and to manage water for present and future use (Section 5.5).
- Prevent the diminution or contamination of surface or subsurface water (Section 5.5).
- Require the sealing of abandoned or unused wells (Section 5.18).
- Determine that an abandoned or unused well endangering public health and safety by creating a water contamination hazard is a public nuisance and take action to abate the nuisance (Section 6.1).
- Establish zones and levy and collect from within a zone (Sections 3 and 26).
- Use groundwater charges to further District activities to protect and augment water supplies (Section 26).

3.3.2 Groundwater Management Programs

Continuation of the District's proactive groundwater management programs is critical to sustaining and protecting groundwater resources from land subsidence and contamination. The groundwater supply is protected through multiple approaches. The District's Wells and Water Production Unit inspects all well construction and destruction to ensure compliance with state and District regulations. The County of Santa Clara provides regulatory oversight of fuel leak sites, formerly overseen by the District. The District's Groundwater Monitoring and Analysis Unit tracks the investigation and remediation of high-threat solvent and toxic contaminated sites under the jurisdiction of the Regional Water Quality Control Board (RWQCB) and other regulatory agencies. The Groundwater Monitoring and Analysis Unit also runs the groundwater models, monitors groundwater quality and quantity, and performs special studies relating to groundwater basin management. These and other District groundwater management programs are summarized in Table 3-3.

Table 3-3 Groundwater Management Programs

Project / Program	Brief Description
Conjunctive Water Management	To optimize the use of groundwater and surface water resources, the District implements an active conjunctive use program as a key element of its overall water management strategy. Surface water is treated for distribution (reducing direct demands on groundwater) and is also stored in local subbasins through managed recharge. Conjunctive use helps to protect against groundwater overdraft and land subsidence, prevent saltwater intrusion, and enhance natural recharge. The potential for using advanced treated recycled water for groundwater recharge is being considered.
Groundwater Resources Planning and Development	As groundwater is a critical local resource for Santa Clara County, the District is involved in groundwater resources planning and development to ensure long-term sustainability of the resource. Related planning efforts include the Integrated Water Resources Plan, Water Supply and Infrastructure Master Plan and the Groundwater Management Plan. The District also reviews land use planning documents as appropriate to ensure groundwater resources are protected. A pilot District-owned well field capable of tying directly into the treated water distribution system is currently being developed. The District is investigating the feasibility of additional well fields to improve overall water supply reliability and increase operational flexibility.
Groundwater Resources Protection	Groundwater protection efforts include well construction and destruction programs, the evaluation of groundwater quality conditions and potential threats, and the development of protection strategies for non-point sources (e.g., nitrate and storm water runoff) and point sources (e.g., industrial releases). The District provides peer review to regulatory agencies on high-threat contamination cases and monitors legislation, regulations, and projects that may impact groundwater quality, including water recycling and storm water management. Protection efforts also include community outreach through workshops and outreach materials.
Groundwater Monitoring	Groundwater monitoring data is essential to understanding current groundwater conditions and discovering adverse trends before they become intractable. The District actively monitors groundwater elevations, groundwater quality, and land subsidence and summarizes results in monthly groundwater level reports and an annual groundwater quality report. The District assesses the groundwater monitoring network and revises as needed.
Groundwater Analysis and Modeling	The District uses groundwater models as a tool to support conjunctive use programs and water supply planning efforts. Special studies and analyses also help the District to improve our understanding of local groundwater resources.

3.3.3 Groundwater Subbasins

Within Santa Clara County, the District manages two groundwater subbasins that transmit, filter, and store water: the Santa Clara Subbasin (DWR Subbasin 2-9.02) and the Llagas Subbasin (DWR Subbasin 3.301). The rights to pump groundwater from the basin has not been adjudicated or has DWR identified the basin as overdraft or projected that the basin will become overdraft. In its water supply planning, the District frequently splits the Santa Clara Subbasin into two subareas, the Santa Clara Plain and the Coyote Valley. Although part of the same subbasin, these two subareas have different groundwater management challenges and opportunities from each other and are in different groundwater charge zones. The subbasin study areas are shown in Figure 3-1.

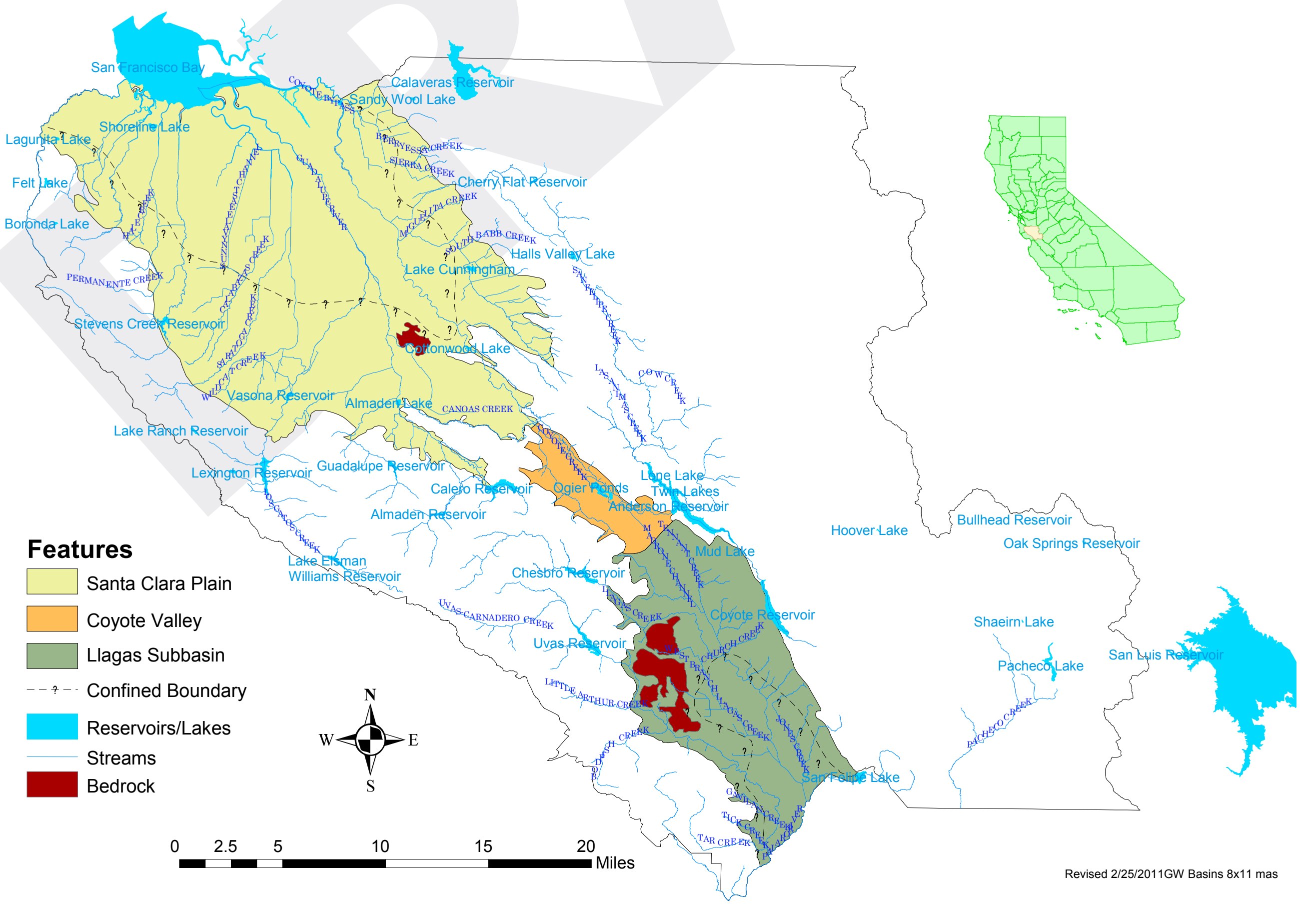
These subbasins contain young alluvial fill formation and the older Santa Clara Formation. Both formations are similar in character and consist of gravel, sandy gravel, gravel and clay, sand, and silt and clay. The coarser materials are usually deposited along the elevated lateral edges of the subbasins, while the flat subbasin interiors are predominantly thick silt and clay sections inter-bedded with smaller beds of clean sand and gravel. A general discussion of each groundwater area is provided below.

3.3.3.1 Santa Clara Plain

The Santa Clara Plain is part of the Santa Clara Subbasin, located in a structural trough that is bounded by the Santa Cruz Mountains to the west and the Diablo Range to the east. The Santa Clara Plain, which is approximately 22 miles long, narrows from a width of 15 miles near the county's northern boundary to about half a mile wide at the Coyote Narrows, where the two ranges nearly converge. The Santa Clara Plain has a surface area of 225 square miles. The Santa Clara Plain is approximately 15 square miles smaller than the Santa Clara Subbasin (Basin 2-9.02) as defined by DWR in Bulletin 118, Update 2003 since it does not include the Coyote Valley portion of the Santa Clara Subbasin. Although hydraulically connected, the District refers to the Coyote Valley separately (see description below) because it is in a different groundwater charge zone than the Santa Clara Plain and has fewer water supply options than the Santa Clara Plain. The Santa Clara Plain underlies the northerly portion of the Santa Clara County and includes the majority of the streams and recharge facilities operated by the District.

The District estimates the long-term operational storage capacity of the Santa Clara Plain to be 350,000 AF. In any given year the amount of groundwater that can be withdrawn depends on current groundwater conditions and hydrology. District defines operational storage capacity as the volume of groundwater that can be stored in a basin or subbasin as a result of District management measures. Operational storage capacity is generally less than total storage capacity as it accounts for the available pumping capacity and the avoidance of both land subsidence and high groundwater conditions.

Figure 3-1 Groundwater Subbasin Study Areas in Santa Clara County



3.3.3.2 Coyote Valley

The Coyote Valley portion of the Santa Clara Subbasin is an alluvial filled basin hydraulically connected to the Santa Clara Plain to the north. The Coyote Valley extends from Metcalf Road south to Cochrane Road, where it joins the Llagas Subbasin at a groundwater divide. The Coyote Valley is approximately seven miles long and ranges in width from a half mile at the Coyote Narrows to three miles, with a surface area of approximately 15 square miles. The District estimates the operational storage capacity of the Coyote Valley to be between 23,000 and 33,000 AF.

3.3.3.3 Llagas Subbasin

The Llagas Subbasin extends from the groundwater divide at Cochrane Road, near Morgan Hill, to the Pajaro River (the Santa Clara San Benito County line) and is bounded by the Diablo and Coast Ranges. The Llagas Subbasin is approximately 15 miles long, three miles wide along its northern boundary, and six miles wide along the Pajaro River. DWR Bulletin 118, Update 2003 identifies this subbasin as Basin 3-3.01 and includes it as part of the Gilroy Hollister Groundwater Basin. The depth of alluvial fill and the underlying Santa Clara Formation varies from about 500 feet at the northern divide to greater than 1,000 feet at its south end. The District estimates the operational storage capacity of the Llagas Subbasin to be between 150,000 and 165,000 AF.

3.3.4 Natural Groundwater Recharge

Recharge to the groundwater basin consists of both natural groundwater recharge and artificial recharge of local surface water and imported water. Natural groundwater recharge includes recharge from rainfall, net leakage from pipelines, seepage from the surrounding hills, seepage into and out of the groundwater basin, and net irrigation return flows to the basin. Effective natural groundwater recharge is that portion of natural groundwater recharge that contributes to usable water supply. Estimates of the effective natural groundwater recharge (based upon groundwater basin modeling) for the three groundwater study areas are shown in Table 3-4.

Table 3-4 Effective Natural Groundwater Recharge (acre-feet per year)

Hydrologic Condition	Santa Clara Plain	Coyote Valley	Llagas Subbasin	Total
Average	35,100	2,200	23,000	60,300
Wet (1983)	56,300	5,300	33,500	95,100
Single Dry (1977)	26,900	1,300	19,700	47,900
Multiple Dry Year Average (1987 – 1992)	27,400	2,000	21,000	50,400

3.3.5 Managed Groundwater Recharge

As effective natural recharge is not sufficient to replenish the amount of groundwater withdrawn annually, the District conducts an active managed recharge program. The District operates and maintains 18 major recharge systems, including over 70 off-stream ponds with a combined surface area of more than 320 acres, and over 30 local creeks. Runoff is captured in the District's reservoirs and released into both in-stream and off-stream recharge ponds for percolation into the groundwater basin. In addition, imported water is delivered by the raw water conveyance system to streams and ponds.

3.3.6 Wells

The District does not currently operate groundwater wells and is not able to directly substitute groundwater for surface water due to a lack of District-owned water supply wells and related infrastructure. However, the District is currently pursuing well fields that will tie directly to the treated water distribution system for increased operational flexibility and system reliability. A pilot facility, the San Tomas Well Field, is currently being developed in Campbell.

Existing water supply wells owned and operated by retailers will be able to provide emergency backup to treated water supplies when sufficient groundwater is available. The District will continue to explore opportunities to re-operate the water supply system to improve the integration of surface water and groundwater resources. The District intends to work with local retailers to ensure that backup groundwater supplies are ready and available from retailers' wells when needed to supplement treated surface water supplies.

3.3.7 Historical Groundwater Pumping

While the District manages the groundwater basin, groundwater in the county is pumped by others including major water retailers, private well owners, and agricultural users. The District can influence groundwater pumping through financial and management practices, but it does not directly control the amount of groundwater pumped.

Table 3-5 below summarizes the total groundwater pumped from each of the three subbasins within the county for the years 2000 through 2009. As noted in the sections above, groundwater includes imported and local supplies that have been recharged into the groundwater basin. The groundwater elevations in the principal aquifers, the source of the majority of the groundwater used in the county has been within the District's targets based on operational storage capacity.

Table 3-5 Historical Groundwater Pumping (AFY)

Groundwater Study Area	2000	2001	2002	2003	2004
Santa Clara Plain	112,600	115,400	104,700	96,500	105,700
Coyote Valley	7,900	6,900	6,700	6,800	7,300
Llagas Subbasin	44,300	47,100	44,600	41,600	45,900
	2005	**2006**	**2007**	**2008**	**2009**
Santa Clara Plain	87,500	82,600	109,800	107,700	97,900
Coyote Valley	7,000	10,900	11,400	13,200	13,500
Llagas Subbasin	43,700	42,100	49,700	48,500	43,800

3.4 Imported Water Supplies

District imported water is conveyed through the Sacramento-San Joaquin Delta and then pumped and delivered to the county through three main pipelines: the South Bay Aqueduct, which carries water from the State Water Project (SWP), and the Santa Clara Conduit and Pacheco Conduit, both of which bring water from the federal Central Valley Project (CVP).

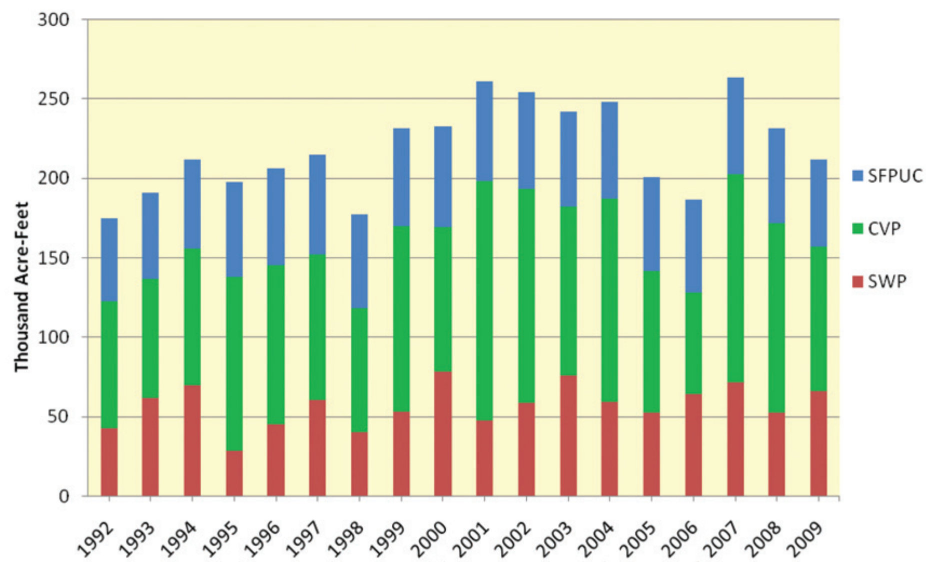
California Aqueduct

The District has a contract for 100,000 AFY from the SWP, and nearly all of this supply is used for M&I needs. The District's CVP contract amount is 152,500 AFY. On a long-term historical average basis, 83 percent of the CVP supply is delivered for M&I use, and 17 percent is delivered for irrigation use. The actual amount of water delivered is typically less than these contractual amounts and depends on hydrology, conveyance limitations, and environmental regulations. The District routinely acquires supplemental imported water to meet the county's needs from the water transfer market, water exchanges, and groundwater banking activities.

In addition to the District's contracted supplies from the SWP and CVP, eight retail agencies and NASA-AMES in Santa Clara County contract with the City and County of San Francisco to receive water imported from the Tuolumne River watershed as well as from watersheds around the Bay Area. The eight agencies are the cities of Palo Alto, Mountain View, Sunnyvale, Santa Clara, San José and Milpitas, Purissima Hills Water District, and Stanford University. NASA-AMES is considered a retail customer of San Francisco. This imported water is conveyed through the regional water system owned and operated by the San Francisco Public Utilities Commission (SFPUC). The District does not control or administer SFPUC supplies delivered to the county; however, this supply reduces the demands on District-supplied water.

Historical imported deliveries to Santa Clara County from SWP, CVP, and the SFPUC system are shown in Figure 3-2.

Figure 3-2 Imported Water Supplies



Notes: CVP and SWP supplies are total deliveries and include supplies from Semitropic water bank, carry-over, sales, transfers, and exchanges.

Table 3-6 summarizes the contract amount, normal year, multiple dry year and single dry year supplies for each of the three sources of imported water for the county. SWP and CVP imported supplies are based on the "State Water Project Delivery Reliability Report 2009" and associated CALSIM II modeling results for hydrologic years 1922 through 2003 with 2029 demands and level of development including climate change.

The 2009 Delivery Reliability Report is the most recent update, and identifies several emerging factors that have the potential to affect the availability and reliability of SWP supplies. To ensure a conservative analysis, the DWR Report expressly assumes and accounts for the institutional, environmental, regulatory, and legal factors affecting SWP supplies, including but not limited to the following: water quality constraints, fishery protections, and the operational limitations imposed by the United States Fish and Wildlife Service (FWS) and National Oceanic and Atmospheric Administration Fisheries Service.

DWR's 2009 SWP Delivery Reliability Report demonstrates that the projected long-term average delivery amounts of contractual SWP Table A supplies have decreased in comparison to previous estimates. However, the projections developed by DWR are predicated on conservative assumptions, which make the projections useful from a long-range urban water supply planning perspective.

Table 3-6 Santa Clara County Imported Water Supplies (AFY)

Source	Contract Amount	Normal Year (2002)	Multiple Dry Year Avg. (1987-1992)	Single Dry Year (1977)
SWP[1]	100,000	64,000	31,830	11,000
CVP[1]	152,500	108,120	80,270	69,180
SFPUC supplies through 2018[2]	-	65,500	50,150[3]	52,600[3]
SFPUC supplies after 2018[4]	-	63,850	48,500[3],[5]	50,950[3],[5]

Notes:
(1)SWP & CVP values are based on DWR 2009 Reliability Study and CALSIM II modeling results for future 2029 conditions with climate change and include both M&I and Ag.
(2) Based on Interim Supply Allocations adopted by SFPUC in December 2010.
(3) Based on "Procedure for Pro-Rata Reduction of Wholesale Customers' Individual Supply Guarantees" under 2010 demand conditions and Tier Two Allocations calculation spreadsheet provided by BAWSCA.
(4) Based on SFPUC Individual supply guarantees (ISGs).
(5) For planning purposes, BAWSCA has recommended that all its agencies use the values associated with the Tier Two Drought Allocation Plan for all years out to 2035. San Jose and Santa Clara have temporary/interruptible contracts with the SFPUC. If a drought were to occur at such time that the SFPUC has terminated or reduced either or both of these cities' individual contracts, their drought allocations would be diminished or eliminated.

3.4.1 Supply Diversity and Import Minimization

The District currently benefits from a diverse water supply including local surface supplies and groundwater, SWP and CVP imported water contracts, banking operations, and recycled water. In addition, the District continues to explore local options, such as expanded conservation, groundwater recharge, expanded groundwater emergency pumping, water recycling, desalination, and local and regional storage to promote greater resource diversity.

Pursuing supply diversity is important in maintaining a robust water supply that will help see the county through changes in climate, hydrology, and increasing demands. However, even with a diverse supply, the District will still be reliant on imported supplies.

3.4.2 Bay-Delta Imported Supplies

Imported water is conveyed through the Delta to the county from Northern California watersheds. This water is delivered by the State Water Project (SWP) and the Central Valley Project (CVP). Imported water supply is treated and delivered to water retailers, and is also delivered by the District's raw water conveyance system to streams and ponds for groundwater recharge.

Management of the imported water program includes protecting the District's assets (CVP, SWP, and other contract rights), meeting current year operational needs for imported supplies, developing water transfers, exchanges and banking agreements, and controlling costs.

3.4.2.1 Projects and Programs

Water imported from the CVP and SWP provides, on average, 40% of the supplies used annually in the county and the District works to safeguard its access to these supplies. Table 3-7 and the following sections summarize the imported water projects and programs.

3.4.2.2 Transfers and Exchanges

Annual imported supplies, transfers and exchanges, carryover supplies and a water banking program help the District manage uncertainty and variability in supply as each water year develops. In addition, spot market transfers, dry year options transfers, and drought response actions can efficiently supplement supply. Water transfers can be an important asset to system operational flexibility when used in combination with groundwater, surface water storage, and treated water. The District considers and evaluates transfer opportunities as they become available.

3.4.2.2.1 Short-Term Transfers

Short-term, or spot-market, water transfers usually involve an agreement to purchase water within a one- to two-year period. The District routinely uses short-term water transfers to increase water supplies in times of shortage. In years when the Governor has declared a State drought emergency (most recently, 2009), the District purchased water from the State Drought Water Bank. In other dry years, SWP and CVP contractor groups (the State Water Contractors and San Luis and Delta-Mendota Water Authority) have developed collective water purchase programs. In these programs and in the State Drought Water Bank, the District's access to transfer water is limited to its pro-rated share, which is typically based on SWP or CVP contract amount. Therefore, the District also carries out transactions independently with sellers in the market, including other water contractors and water rights holders. For example, in the recent dry years of 2007-2009, the District made annual purchases of 3,100 AF from Browns Valley Irrigation District in the Yuba River watershed.

These types of water transfers are a valuable tool to manage annual variations in supply, but implementation is a dynamic process. The price of short-term transfers increases as the outlook for the year's hydrology becomes critically dry, and/or as regulatory restrictions limit pumping of imported water from the Delta. Finding willing sellers and completing agreements requires substantial staff time, and it is usually necessary to make purchase commitments relatively early in the year, before the District's overall water supply situation is fully known. There is a risk that the supply available in the market will be insufficient to meet the District's needs. There is also a risk that the District may commit to buy water and find out later in the spring that the short-term transfer is not needed. To manage changing conditions, the District has occasionally both bought and sold short-term water transfers within the same year.

3.4.2.2.2 Long-Term Transfers

Long term transfers refer to transfer agreements that provide terms and conditions for the transfer of water over multiple years. Dry-year option transfers include entering into a long-term contract with another party or parties to purchase additional imported water under specific conditions. For example, an agreement may provide the District with an option to buy when SWP or CVP allocations fall below a certain threshold. These agreements often include an option payment due every year, with an additional amount payable in the years that the water is actually delivered.

Table 3-7 Imported Water Projects and Programs

Projects and Program	Brief Description
The Bay Delta Conservation Plan	The Bay Delta Conservation Plan (BDCP) is a process aimed at the dual goals of improving Delta ecosystem health and improving water supply reliability. Specifically, the BDCP will secure long-term Endangered Species Act permits for SWP and CVP operations and covered activities, including the potential construction of an isolated conveyance facility. District staff participates with the Department of Water Resources (DWR), the U.S. Bureau of Reclamation (USBR), SWP and CVP contractors, environmental organizations, State and federal resource agencies, and others to develop a viable conservation strategy. Participants in this collaborative process have been developing conservation measures, including (1) habitat restoration; (2) reduction of other stressors such as non-native species, contaminants, predation, harvest and other factors; and (3) alternative Delta conveyance options. Currently, these measures are being refined and combined into a conservation strategy.
The Delta Habitat Conservation and Conveyance Program	The Delta Habitat Conservation and Conveyance Program (DHCCP) is performing the detailed engineering and environmental analysis of the conservation strategy. District staff participates on an Executive Committee and in the technical review of ongoing work. The conveyance conservation measure alternatives that are being analyzed in the DHCCP include through-Delta conveyance, as well as an isolated facility. The isolated conveyance facility would divert water through five new intakes along the Sacramento River between Walnut Grove and Freeport and convey it to the SWP and CVP pumping plants in the south Delta. Intakes will be equipped with state-of-the-art positive-barrier fish screens to reduce entrainment of fish. There is relatively broad agreement within the fisheries conservation community that a properly operated new isolated facility will provide substantial benefits for certain listed species over the existing system. Three isolated facility alternatives are being analyzed: (1) an eastern canal alignment; (2) a western alignment that is part canal and part tunnel; and (3) an "all tunnel" alternative aligned straight through the middle of the Delta (36 miles). Public review drafts of the BDCP and EIR/EIS are currently scheduled to be released at the beginning of 2012, with a record of decision and permits in spring of 2013. Construction of an isolated facility is estimated to require approximately eight years (complete by 2024).

Table 3-7 Imported Water Projects and Programs (continued)

Manage Contract and Policy Issues	The District monitors a wide range of administrative, legislative, regulatory, operational, and other issues that could impact the reliability of imported water supplies. The District's SWP and CVP water service contracts require ongoing interpretation and occasional amendments or letter agreements to resolve operational and financial issues. It is not unusual for contract issues to take many years to resolve. In 2007, the District completed an amendment of its CVP water service contract to incorporate tiered pricing, conservation, and other requirements of the 1992 Central Valley Project Improvement Act, and to improve repayment provisions for the federal CVP facilities that serve Santa Clara County. The District's contract with DWR for supplies from the SWP also was amended in 1995 to address a wide range of water supply and financial issues (the "Monterey Amendment"). A settlement of litigation regarding the Monterey Amendment was approved by the Sacramento Superior Court on May 20, 2003. Pursuant to that settlement, new CEQA documentation was prepared and a Record of Decision was issued in May 2010.
San Luis Reservoir Low Point Improvement Project	The District has partnered with the U.S. Bureau of Reclamation and the San Luis & Delta-Mendota Water Authority (Authority) to complete the San Luis Low Point Improvement Project (SLLPIP). The purpose of the SLLPIP is to identify a feasible alternative that will address the water supply reliability problems associated with the San Luis Reservoir "low-point." The District's CVP water is delivered to the County through San Luis Reservoir. The water flows through the Pacheco Pumping Plant and Conduit to the San Felipe Division of the CVP, which includes the District and San Benito County Water District. During the late summer months, as San Luis Reservoir is drawn down, a thick layer of algae (as much as 35' thick) grows on the reservoir's surface. When the reservoir elevation drops to approximately 300,000 acre-feet (the beginning of the low-point issue), algae begins to enter the San Felipe Division Intake (Pacheco Intake) degrading water quality and making it more difficult to treat the water with existing treatment facilities for municipal and industrial water uses. To address the problem associated the San Luis Reservoir "low point", the SLLPIP is evaluating lowering the Pacheco Intake, expanding Pacheco Reservoir, upgrading treatment processes at Santa Teresa and Rinconada treatment plants and a combination alternative that includes re-operating Anderson Reservoir, conveying a portion of the District's CVP supplies through the South Bay Aqueduct and constructing new groundwater wells and recharge facilities. Public review drafts of the Feasibility Report and EIR/EIS are currently scheduled to be available in the spring of 2011.

Long term transfers may also involve purchase of water rights from another water right holder. Some amount of imported supply would typically be available from the water right every year, usually more in wet years and less in dry years. Such water right transfers can be permanent assignments or can be for a defined period of time with options to renew. Developing a long-term transfer typically involves lengthy environmental review and documentation processes, and related conveyance agreements with the DWR or United States Bureau of Reclamation.

At present, the District has two agreements that are classified as long-term transfers. In 1998, the District and two other agencies (Pajaro Valley Water Management Agency and Westlands Water District) jointly participated in the permanent assignment of 6,260 AF from Mercy Springs Water District, an agricultural Central Valley Project (CVP) contractor. Under the agreement, the District has an option for dry-year supplies totaling at least 20,000 AF over a 20-year period. The dry-year option may continue for subsequent terms depending on the future plans of Pajaro Valley Water Management Agency.

In 2010, the District entered into a four-year agreement with Patterson Irrigation District, a contractor in the San Joaquin Valley with a reliable CVP supply based on their San Joaquin River water rights. The total amount that will be transferred over the term of the agreement is 13,350 AF, with flexible annual deliveries of at least 4,000 AF.

3.4.2.2.3 Exchanges

Exchanges involve one party providing water to another in one year, in return for a like amount of water in a future year. If the exchange agreement provides for return of water in future dry years, the exchange ratio may be higher that one-to-one. The SWP allows contractors to exchange water using ratios up to two-to-one, i.e. for every two acre-feet provided to the exchange partner, one acre-foot is returned in a future dry year. These transactions can improve water supply reliability from year to year, and have other financial or operational benefits. The District has carried out annual exchanges with San Benito County Water District and also works with other CVP contractors in the San Joaquin Valley as exchange partners.

3.4.2.3 Banking Available Supplies for Future Use

In May 1996, the District took the first step in implementing its banking strategy when it approved an agreement with Semitropic Water Storage District (Semitropic) to store 45,000 AF of SWP water in Semitropic's groundwater basin on behalf of the District. In 1997, the District approved a long-term agreement with Semitropic. Under the terms of this agreement, the District has banked water in ten years since 1997, and withdrawn water in four years. The agreement allows the District to maximize the economic value of its imported water contracts by fully utilizing water that might otherwise have to be turned back to the SWP or CVP. For example, in 2006, a very wet year, the District was able to store nearly 58,000 AF of imported water for use in future dry years. The total storage capacity available to the District in the Semitropic Water Bank is 350,000 AF, and the current storage balance (January 2011) is 264,837 AF.

The Semitropic Water Bank is an "in lieu" storage program, meaning that the District does not retrieve its stored water directly from the groundwater basin at Semitropic. Rather, the District retrieves its water by taking SWP water pumped from the Delta at Banks Pumping Plant, in exchange for Semitropic pumping groundwater to meet SWP water needs within its own district, or pumping groundwater into the California

Aqueduct to meet the needs of other SWP contractors downstream. Because the groundwater delivered to the California Aqueduct is exchanged with overall SWP supplies, this component of the District's Semitropic Water Bank retrieval (up to 31,500 AF) is usually not limited by annual SWP contract allocations. The District's ability to take additional water from the Semitropic Water Bank (up to 78,000 AF total) is proportional to SWP allocations, because this component of the exchange is limited to Semitropic's own SWP contract supply. During drought years, this can significantly limit how much of its water bank balance the District can withdraw. The quality of water delivered to the District is the same as the District's SWP contract water conveyed through the Delta and the South Bay Aqueduct.

3.4.2.4 CVP Reallocation Agreement

In 1997, the District executed a Water Reallocation Agreement with the United States Bureau of Reclamation (USBR) and agricultural districts in the San Luis and Delta-Mendota Water Authority that establishes the basic level of reliability for the District's CVP Municipal and Industrial (M&I) water supplies. This 25-year agreement resolved disputes related to the USBR's Interim M&I Water Shortage Policy that provides CVP M&I water allocations of no less than 75 percent of historic use under most conditions. In addition, Westlands and San Luis Water districts agreed to augment the District's supplies in certain years to bring District CVP M&I reliability up to 75 percent of contract amount. In return, the District reallocated 100,000 AF of CVP water to the agricultural districts, and agreed to share shortages equally in wetter years when CVP annual allocations are 75 percent or greater.

3.4.2.5 CVP Interim M&I Water Shortage Policy

In 2001, building upon a draft policy developed in 1994, the USBR released an interim allocation policy for CVP Municipal and Industrial (M&I) water contractors. The purposes of the policy are as follows: (1) define water shortage terms and conditions applicable to all CVP M&I contractors, as appropriate; (2) establish CVP water supply levels that will support the economies and residents of municipalities; (3) assist the M&I contractors in their efforts to protect public health and safety; (4) sustain urban areas during droughts, and (5) provide information to M&I contractors in support of their water supply planning efforts. In 2010, the USBR held a series of four workshops to prepare for finalizing the Interim M&I Water Shortage Policy and is moving forward with further evaluation and environmental analysis in 2011.

3.4.3 San Francisco Public Utilities Commission (SFPUC) Supplies

One of the major goals of the District's water supply management program is to protect baseline water supplies in Santa Clara County, including those from SFPUC. SFPUC supplies constitute about 16 to 19 percent of the overall water supply in Santa Clara County and contribute to the diversity of water supply sources. If the quantity of SFPUC supplies and use in the county were to diminish in the future, the District would likely need to make up the lost supply through additional investments in new supply options or demand management. This potential reduction of SFPUC supplies could result from retailers' shift in use due to the price differential between SFPUC supplies and the District's groundwater production charge, or from SFPUC supply interruption to the cities of San José and Santa Clara.

In 2009, San Francisco renewed its water supply agreement with 27 wholesale customers in Alameda, San Mateo, and Santa Clara counties. Consolidation since 2009 has reduced the number of wholesale customers to 26. The new agreement has a 25-year term, with provisions for two five-year extensions. The agreement stipulates that combined deliveries to wholesale customers outside of San Francisco are subject to the interim supply limitation of 184 million gallons per day (MGD) at least through the year 2018. A surcharge will be imposed to enforce the interim supply limitation. By December 31, 2018, San Francisco will make further decisions regarding long-term water supplies through 2030.

In their individual water sales contracts with San Francisco, the cities of San José and Santa Clara retain their temporary interruptible status. San Francisco will supply a combined annual average of 9 MGD to the two cities through 2018, subject to interruption or reduction if wholesale customer use exceeds the 184 MGD limit.

Furthermore, the individual supply guarantees of the 24 wholesale customers (other than Hayward, San José and Santa Clara) are subject to reduction on a pro-rata basis if total delivery to City of Hayward and to the wholesale customers exceeds 184 MGD over a consecutive three-year period.

The practical implications to water supplies in Santa Clara County are as follows:

- Long-term SFPUC supplies will likely diminish, as overall demand among the SFPUC wholesale customers increases.
- Interim (before 2018) SFPUC supplies will likely diminish during years of shortage, because San José and Santa Clara are interruptible customers.
- Use of SFPUC water will likely diminish while use of groundwater and/or District treated water will likely increase because of the pricing differential and because of the new contract provision that allows transfer of SFPUC water among the wholesale customers.

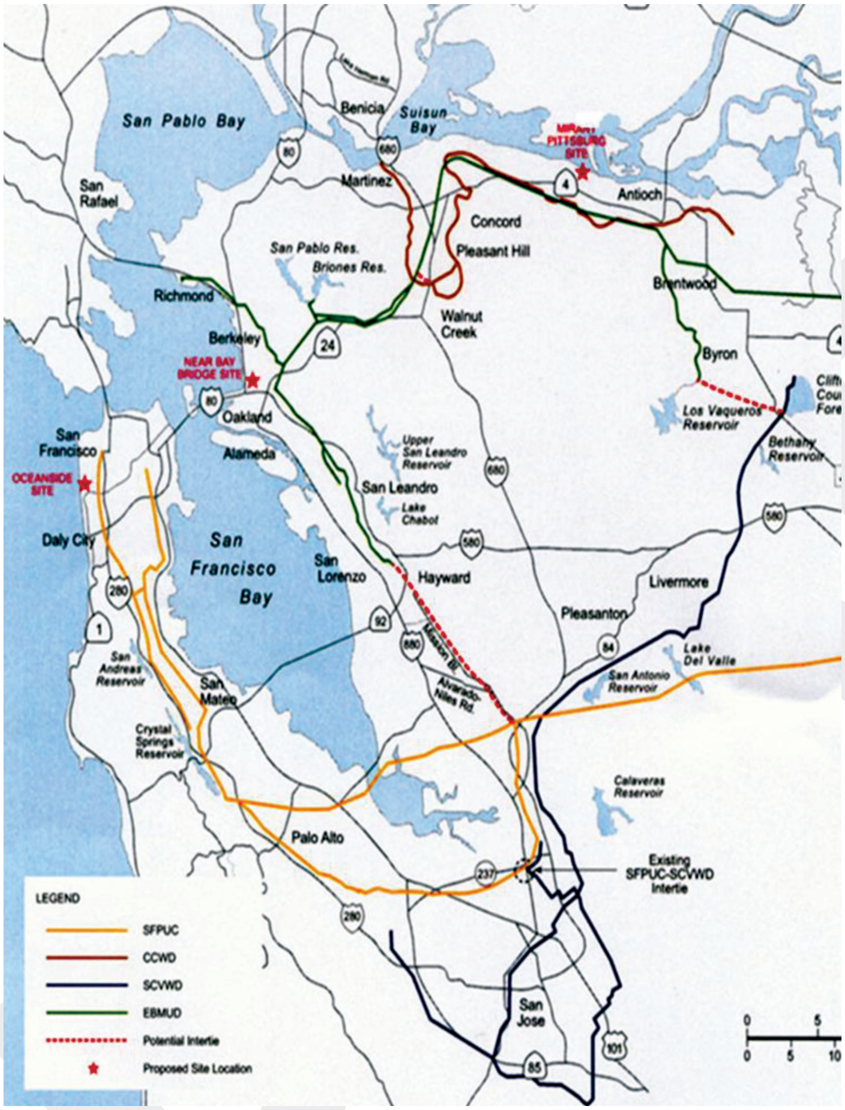
3.5 Desalination – Potential Supply

Desalination is the removal of dissolved salts from ocean, bay or brackish water, thereby rendering that water as drinking water supply. An area such as Santa Clara County could have a potential desalination facility in this region by sheer location next to the bay and the proximity to the Pacific Ocean. Desalination has over thirty years of municipal application in this country and interest in desalination has increased in the last decade due to advances in commercially available membrane technology and a significant drop in their costs.

3.5.1 Bay Area Regional Desalination Project

The District is evaluating whether desalinated water could meet local water supply needs. The District has collaborated with the San Francisco Bay Area's four other water agencies that collectively serve 5.4 million people. The five agencies working on the Bay Area Regional Desalination Project (BARDP) are: Contra Costa Water District, East Bay Municipal Utility District, San Francisco Public Utilities Commission, Zone 7 Water Agency, and Santa Clara Valley Water District. The benefits these five agencies bring, is the desire to leverage existing pipelines and interties and to share a regional facility that minimize costs and environmental impacts. Existing distribution pipelines and interties are shown in Figure 3-3.

Figure 3-3 BARDP Agencies Distribution Pipelines



The BARDP aims to achieve the following:

- Increase supply reliability by providing water supply when needed from a regional facility.
- Provide additional source of water during emergencies such as earthquakes or levee failures.
- Provide a supplemental water supply source during extended droughts.
- Allow other major facilities, such as treatment plants, water pipelines, and pump stations, to be taken out of service for maintenance or repairs.

3.5.1.1 Project Status

Technical studies such as the pre-feasibility study and the Phase 1 study were conducted from 2003 – 2005 and they identified potential locations in the Bay Area for a regional facility. The Feasibility Studies also completed environmental, institutional and permitting feasibility in addition to the technical studies. From 2007 -2009, pilot design and pilot studies were conducted. Technical study costs to date ($2.5 million) were equally divided between the four agency proponents (Zone 7 Water Agency was not a part of this group then, having joined in 2010) and supplemented by the State Department of Water Resources grant funds ($250,000 grant for the Feasibility Study and $1,000,000 for the Pilot Phase). In addition, $4 million in federal assistance (Water Resources Development Act of 2007) was authorized for the continued development of this project should the agencies commit to the project after development of the institutional framework (2010 effort). Project Milestones and estimated completion dates for the effort are shown below in Table 3-8.

Table 3-8 Proposed BARDP Schedule*

PROJECT MILESTONES	COMPLETION DATE
Pre-Feasibility Studies (COMPLETE)	2003 and 2005
Engineering Study (COMPLETE)	2007
Pilot Testing (COMPLETE)	2009
Institutional Framework	2010
Preliminary Design and detailed conveyance modeling efforts	2011
Environmental Study	2012
Design & Permitting	2013
Construction	2015

*For updates and additional information refer to: www.regionaldesal.com

3.5.2 Brackish Groundwater

In the 2005 Urban Water Management Plan, the District reported on the intent to conduct the feasibility of brackish desalination. From 2005-2008, the Santa Clara Valley Water District and San Benito County Water District embarked on a joint feasibility study to evaluate the potential for treating brackish groundwater in the Pajaro Watershed for potable uses. San Benito County Water District and the District are common Central Valley Project contractors and have a mechanism available to exchange or transfer water. The Pajaro Watershed Groundwater Desalination Feasibility Study applied a centralized regional study approach for evaluating a site known to have considerable brackish groundwater. This feasibility study attempted to determine if a joint desalination project could significantly reduce infrastructure development, minimize environmental impacts, and provide effective and coordinated redundancy/backup facilities to be shared by both agencies. The state's Proposition 50 grant provided 50 percent of the costs for this feasibility effort. The Feasibility Study was an 18-month effort with stakeholder outreach an integral part of the effort.

The District also worked with Stanford University on piloting brackish water feasibility for a list of technical objectives. Pilot skids with membrane filters were piloted at two brackish water sites. This project also received 50 percent funding from the Metropolitan Water District's Desalination Research Innovation Partnership Grant Program (DRIP Program). This was a highly technical study involving the assessment of various brackish water membranes and also included a fouling study component to determine cost-effectiveness of running different membrane systems due to their operating efficacies and cleaning requirements.

Although from a technical viewpoint the membranes worked efficiently to produce high-quality water, the result of this effort was that management of the waste stream from this process (the brine stream) was too expensive to manage. Most land-locked sites would face similar difficulties when managing brine.

3.6 Maintaining and Expanding Water Supply and Infrastructure

As described in detail in this report and particularly in this chapter, the District manages and operates a complex and integrated water supply system including storage, transmission, treatment, and recycled water facilities to meet the water supply needs of current and future generations. The District's existing and planned water supplies and infrastructure will continue to meet most of the county's needs in the future. However, supplies and infrastructure need to be expanded or supplemented to meet new demands under a variety of future scenarios.

For the decades ahead, the highest priority work of the District's Water Utility Enterprise is to implement programs to ensure that water supplies are diversified and reliable to meet current and future demands and treated water quality standards are met. This program of operations, maintenance, and capital improvement activities will require continued funding from groundwater production charges and other sources of revenue. Operations and capital programs continue to emphasize activities to protect and maintain existing water supplies and assets and to plan for contingencies due to both hydrologic uncertainties and regulatory restrictions on imported and local supplies.

The Five-Year Capital Improvement Program (CIP) is a projection of the District's capital funding for planned capital projects. With a significant portion of the water supply infrastructure approaching forty to fifty years of age, maintaining and upgrading the existing infrastructure to ensure each facility functions as intended for its useful life is the focus of the Water Supply and Capital Improvement Program. As such, the majority of capital projects included in the 5-Year CIP are related to asset management which includes the replacement of aging equipment and facilities, or infrastructure reliability, which protects the county's baseline water supply. A rigorous priority-setting process is conducted to ensure that water supply projects reflect the Board's priorities. The Five-Year FY 10-11 CIP includes $490 million for 57 water supply projects including water treatment plant upgrades, the recycled water advanced treatment facility, and Pacheco pumping plant upgrades. Table 3-9 summarizes the specific projects included in the CIP to increase the water supply available to the District.

Table 3-9 Water Supply Projects

Project	Average Yield Increase (AFY)	Estimated Completion Data
Main & Madrone Pipeline Restoration	2,000	2015
Alamitos Diversion Dam	2,200	2013
Coyote Diversion Dam	5,000	2013
Kirk Diversion Dam	4,600	2015

The District is currently engaged in several critical studies related to understanding the conditions of various existing water supply facilities and meeting future water supply needs of the county. These studies include the Water Supply and Infrastructure Master Plan (Water Master Plan) which will likely identify a number of new capital projects with significant capital investments.

3.6.1 Water Master Plan

Additional supplies and related infrastructure required to fill any identified difference between supplies and demands will be established in the Water Supply and Infrastructure Master Plan (Water Master Plan). Potential supply options available to the District will be evaluated in the Water Master Plan and include recycled water, increased conservation, additional imported supplies including exchanges, transfers and options, desalination and new storage.

The Water Master Plan will be the District's plan for meeting Santa Clara County's future water demands and will include a program of proposed water supply and infrastructure projects to meet the county's water needs through 2035.

The assessment of baseline water supply and infrastructure needs is scheduled for completion by mid year 2011. The next step will be to identify and evaluate water supply and infrastructure projects to address supply and capacity needs. Projects and combinations of projects will be evaluated based on how well they meet objectives related to reliability, water quality, cost, environmental benefits, and other benefits. A risk analysis will be performed to evaluate how well the portfolio of projects performs under a variety of risk scenarios. The preferred portfolio of projects should be identified by the end of 2011. The District will develop the implementation program, and adopt the Master Plan in 2012.

2010 URBAN WATER MANAGEMENT PLAN

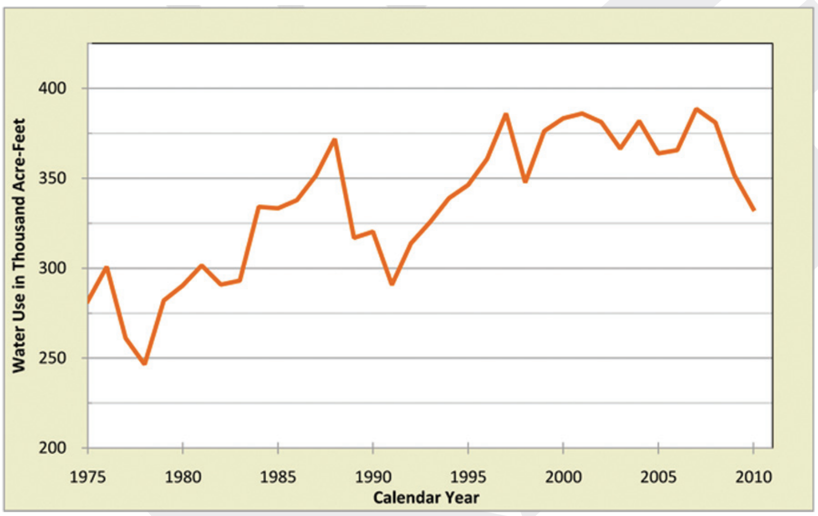
Chapter 4.0 | Historical Water Use and Demand Projections

This chapter provides information on historical water use including use by sector, information on demand projections and the method used to develop these projections. Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist items 1, 3, 25, 33, and 34.

4.1 Historical Water Use

Total water usage in Santa Clara County is estimated to be 332,900 AF in calendar year 2010. Historical water usage for the county from 1975 through 2010 is shown in Figure 4-1.

Figure 4-1 Santa Clara County Total Water Use



Notes:
Water use before 1988 is for the north county only.

The most dramatic variations in Figure 4-1 are the drops in use during the droughts of 1976-1977, 1987-1992 and 2007-2009. Due to supply limitations, either voluntary or mandatory use reduction measures were enacted during these periods, resulting in decreased water use.

Reducing water consumption during water shortages is generally achieved through behavioral changes. Short term conservation generally refers to these behavioral changes that reduce water use over and above long term conservation programs. After a drought ends, water demands may return to previous levels as people return to previous water use habits. Water conservation programs implemented since 1992 have been the largest influence in continued demand reduction. This can be seen in the relatively stable and no real increase in demand since the late 1990s, even though population has increased significantly during the same period.

The steep reduction in water use for the period between 2007 and 2010 was probably a result of the combined effects of a lingering economic recession, a wet spring in 2010 and success of the District's water conservation outreach and coordination efforts with cities, the retailers and the media. The community exceeded the Board's conservation goal and reduced water use by 19 percent for the time period of March 2009 through October of 2010. The savings are relative to the corresponding months of calendar year 2004 water use and are normalized for population growth.

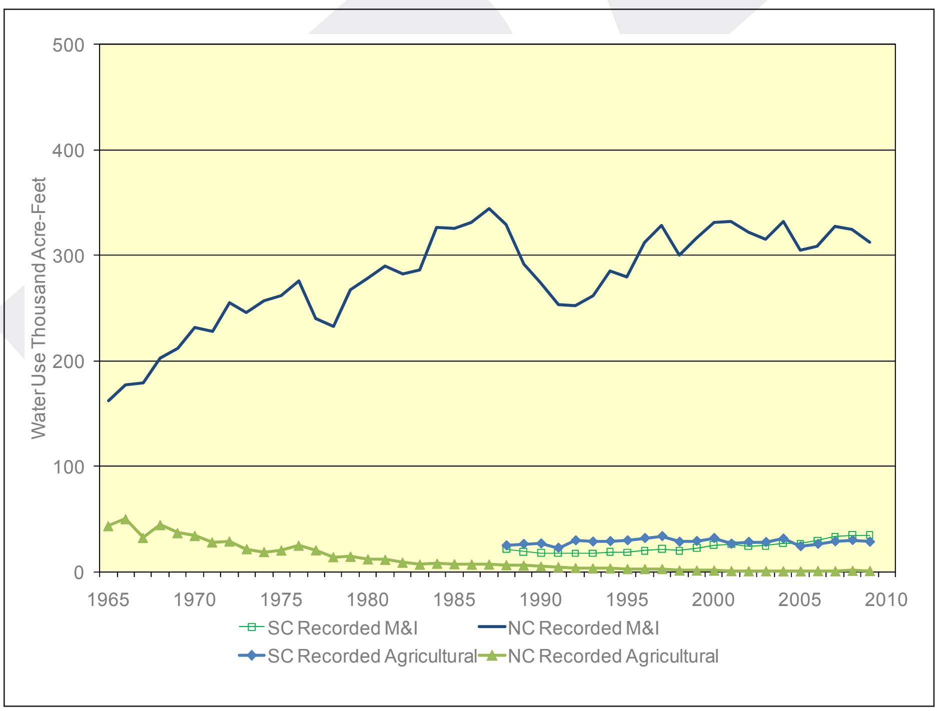
4.1.1 North County and South County Water Use

The District has been recording water use in North County since 1964, but its records for South County water usage are relatively short, beginning in July 1987. North County is generally defined as the portion of the county north of Metcalf Road. North County accounts for approximately 80% of District water consumption. South County is generally defined as the portion of Santa Clara County south of Metcalf Road, including Coyote Valley, Morgan Hill, San Martin and Gilroy.

For the North County, water use has varied from a low of about 175,000 AF in 1965 to a high of about 349,000 AF in 1987. In 2009, North County water use was 329,000 AF, of which less than 2,000 AF was agricultural use. South County total water use over the past few decades has ranged from about 42,000 AF in the drought year 1989 to 56,000 AF in 1997. In 2009, the South County water use was 53,000 AF, of which 28,000 AF was agricultural water use.

Figure 4-2 below shows M&I and agricultural water use for the north and south county.

Figure 4-2 Santa Clara County Agricultural, Municipal and Industrial Water Use



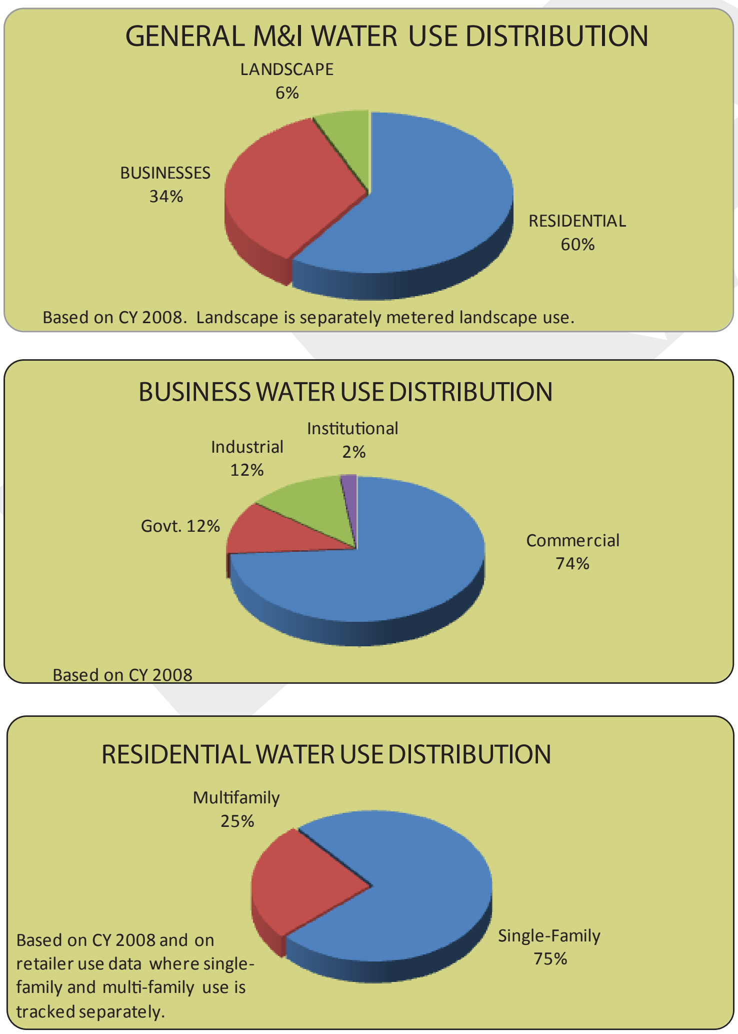
4.2 Use by Sector

Municipal and industrial (M&I) water use, which includes residential, commercial, industrial, and institutional water use, has grown in Santa Clara County as a result of urbanization. Conversely, agricultural water use has declined as irrigated agricultural land has been converted to other uses. District records show that the water use in the county is greater than 90 percent municipal and industrial and less than 10 percent agricultural.

As a wholesaler, the District does not collect water use data segregated by classification. However, the District does request and attempts to utilize water use by customer class data provided by the water retailers. Many of the retailers in the county use a different classification breakdown, making compilation and designation of use by sector difficult.

The estimated countywide use by sector, based on 2008 water retailer sales data, appears in Figure 4-3. The water use by sector information presented in Figure 4-3 does not include all water use in the county, as some retailer data does not separate residential uses from non-residential uses, or separate multifamily and single family use. Therefore the analysis is based on the limited data where the use by sector data was available.

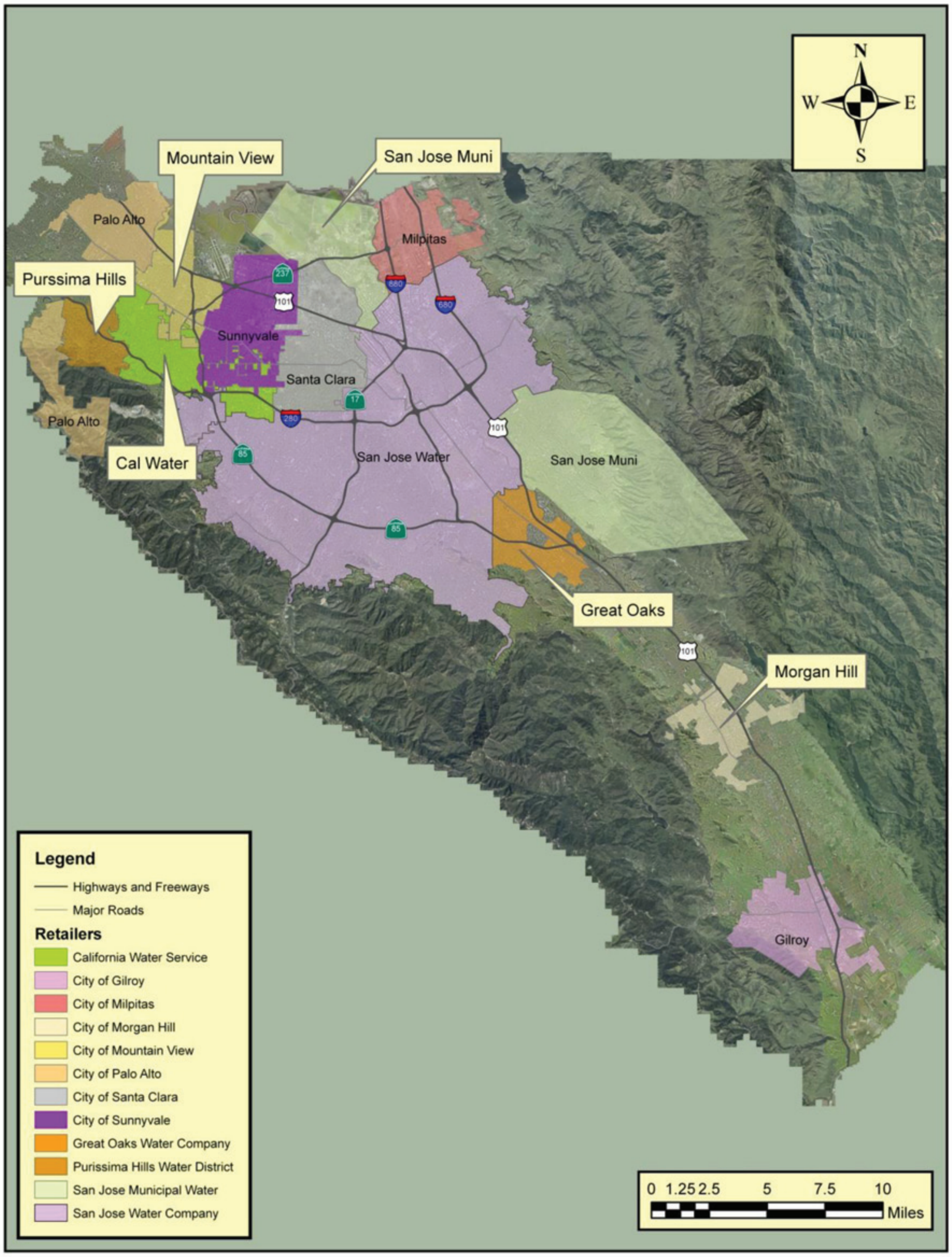
Figure 4-3 County Water Use by Sector



4.3 Demand Projections

Consistent with section 10631(k) of the Urban Water Management Planning Act, demand projections by source were requested from each of the retailers. A map of the water retailer service areas is shown in Figure 4-4.

Figure 4-4 Water Retailer Service Areas



Demand projections, as provided by each of the retailers in five year increments to 2035, are shown in Table 4-1. As the water supply wholesaler, (and confirmed by DWR staff at the February 25, 2011 UWMP Workshop, held in the District Board Room) the District is not required to breakout projected water use for single-family and multifamily residential housing needed for lower income households because these will be included in the individual retailer UWMPs and are included in the demand projections summarized in Table 4-1.

Table 4-1 Retailer Demand Projections after Conservation Savings[1] (AFY)

Retailer	2015	2020	2025	2030	2035
Cal Water Service Co.	14,060	12,710	12,920	13,120	13,330
Gilroy, City of	8,070	7,760	8,450	9,190	9,940[2]
Great Oaks Water Co.[3]	13,260	13,420	13,830	14,250	14,660
Milpitas, City of[4]	15,280	16,240	17,220	18,240	19,320
Morgan Hill, city of	8,970	8,520	8,990	9,580	10,160
Mountain View, City of[4]	14,280	14,860	15,430	16,000	16,750
Palo Alto, City of	14,190	14,460	14,690	15,500	16,310[2]
Purissima Hills Water District[4]	3,130	3,320	3,490	3,660	3,830
San José Municipal Water[5]	32,140	35,230	38,460	42,120	45,780
San José Water Co	143,790	147,860	150,930	154,080	157,290
Santa Clara, City of	31,260	33,050	34,610	36,070	37,430
Stanford University	5,100	5,740	6,250	6,860	7,470[2]
Sunnyvale, City of[4]	27,480	27,900	28,390	28,920	29,800
Independent Groundwater Pumping[6]	15,600	15,600	15,600	15,600	15,600
Agriculture[7]	29,110	28,140	27,160	26,180	25,250
Total	375,720	384,810	396,420	409,370	422,920

Notes:

(1) Includes conservation savings goal for both urban and agricultural conservation. See Table 5-1 for total District water conservation program water savings goal with 1992 base year.

(2) 2035 value extrapolated from retailer provided data.

(3) From District developed demand projections based on ABAG Projections 2009 calibrated with actual use data.

(4) Projections are based on Table A-2 of the BAWSCA Long-Term Reliable Water Supply Strategy Phase I Scoping Report (May 2010) with adjustments for active conservation.

(5) Projections are consistent with City of San Jose Envision 2040 Draft General Plan Update Preferred Alternative. Includes all of San Jose Municipal's service areas and portions of Coyote Valley where the actual retailer to serve this area has not yet been defined.

(6) Demands for independent pumpers were assumed to continue at the same average level observed in the historical pumping record (2000 – 2009).

(7) Calculated from estimates of projected total agricultural acreage and a water use factor (1.7 AF/acre).

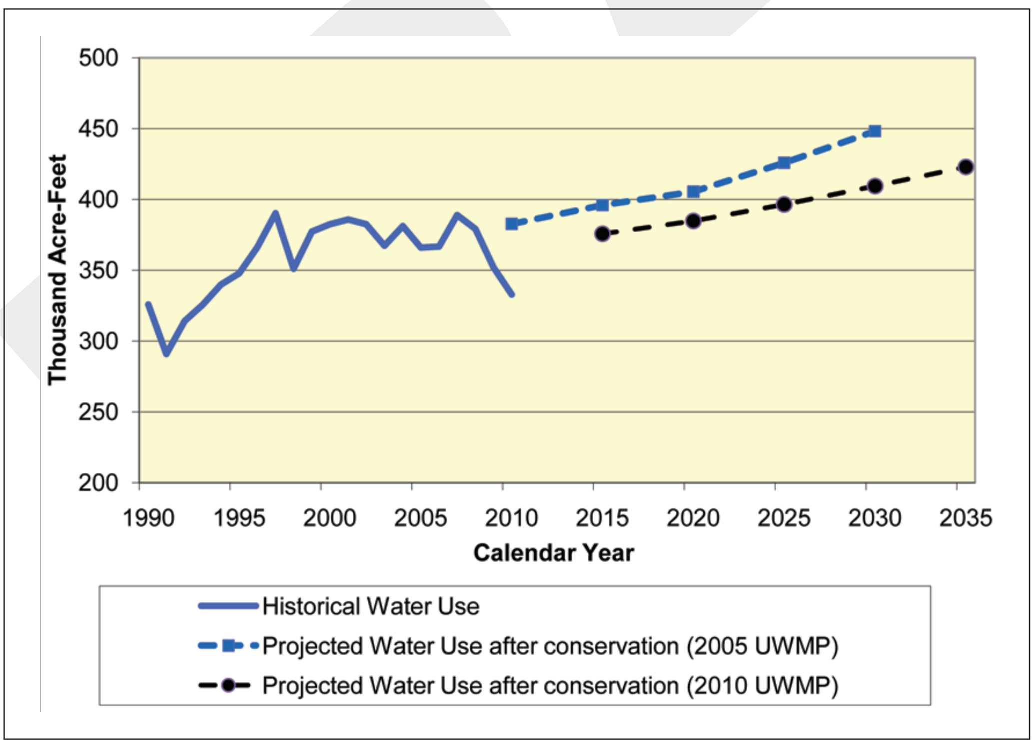
In his 20 percent by the year 2020 plan, former Governor Schwarzenegger determined that for California to continue to have enough water to support its growing population it needs to reduce the amount of water each person uses per day. This reduction of 20 percent per capita use by the year 2020 is supported by legislation SBX7 7 (Steinberg) passed in November 2009.

SBX7 7 requires urban retail water suppliers to adopt 2015 and 2020 water use targets by July 1, 2011. These water use targets have been incorporated into the retailer-provided demand projections summarized in Table 4-1. Note that as a water supply wholesaler, the District is not required to provide baseline daily per capita water use targets, interim targets, and compliance daily per capita water use. Instead, the District is required to include an assessment of present and future measures to help retailers achieve the water use reductions. More detailed information related to water conservation and the District's efforts to help retailers achieve their water use targets is included in Chapter 5.

The District, in cooperation with the water retailers, is working towards a countywide conservation goal of 98,500 AFY in 2030 with 1992 as the base year. Retailer projected conservation was compared to the District projected countywide conservation goal and the total countywide demands were adjusted accordingly.

Figure 4-5 shows total historical water use from 1990 through 2010 and total demand projections with conservation to the year 2035. Preliminary countywide demand projections showed lower near term demand projections and similar longer term projections out to 2030 when compared to those used in the District's 2005 UWMP. However, final demand projections provided by the retailers for the 2010 UWMP show a decrease of nearly 10% in the year 2030 demands compared to projections in the District's 2005 UWMP.

Figure 4-5 Historical and Projected Water Demand



4.3.1 Demand Projection Methodology

In addition, to the retailer provided demand projections, the District performed a separate demand forecast to gain insight into the projected growth dynamics of the county and to better understand the demands provided. The intent of this forecast was to determine emerging trends in water use and compare projected water demands. The demand forecast performed by the District was based on the most current demographic projections available by census tract at the time the analysis was performed (ABAG Projections 2009).

Land-use considerations are used by ABAG to develop their demographic projections and thus are factored into the District's water demand projections. Land use methods are commonly used by city and county planning departments because water use impacts from general plans and zoning changes can be more easily quantified. Such methods are more difficult for wholesale water agencies like the District, because over a dozen general plans are within the District's service area and water use data by land-use-zoning type for Santa Clara County is not readily accessible.

The District's water demand projections used the IWRMAIN (Institute for Water Resources – Municipal and Industrial Needs) forecasting model, a tool developed in the 1980s under the direction of the U.S. Army Corps of Engineers Institute of Water Resources to improve water use forecasting within the Corps. Input data included regional growth projections (ABAG 2009) which were allocated to the water retailers' customer classes. Other data was obtained from the U.S. Census Bureau, Department of Finance, Water Master Plans, Urban Water Management Plans, General Plans and discussions with water retailer and city planning staff.

IWRMAIN uses base year water use and demographic, housing, and business statistics to estimate existing water demands together with the official projections (provided by regional planning agencies like ABAG) of population, housing, and employment to derive projections of water use in future years. The data required by the model is socio-economic data generally available from the U.S. Census and demographic projections available from ABAG. In developing their demographic projections, ABAG looks carefully at local governments' plans and policies while factoring in the regional economic and demographic conditions, giving a more balanced view of the future of the region than can be achieved from analyzing general plans alone. The reader should refer to the retailers' UWMP for discussion of their individual projection methods.

As a wholesaler, the District does not have detailed billing/sales data by customer class. In an effort to project demand by customer class (i.e., residential, business, irrigation), monthly/bimonthly billing data was obtained from the water retailers for years 2000 through 2009. Each water agency has different billing categories which makes countywide sector use difficult to project in a fine level of detail. However, the data was sufficient for most agencies to at least differentiate between residential and non-residential water use. The 2000 water sales data was used as the base year, which coincides with a census year and near average weather. Subsequent years were used for model calibration and verification. The preliminary demand projections developed by the District resulted in demand projections of approximately 10 percent greater than those provided by the retailers.

This page intentionally left blank.

5 2010 URBAN WATER MANAGEMENT PLAN

Chapter 5.0 | Demand Management Measures

5.1 Background

The District has been and continues to be a leader in water conservation with programs that are innovative and comprehensive in scope. This is consistent with Board Ends Policy E-2.1.6, which states the following: "maximize water use efficiency, water conservation and demand management opportunities." Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist items 2, 26 through 29, and 32.

As one of the initial signatories to the California Urban Water Conservation Council's (CUWCC) 1991 Memorandum of Understanding Regarding Urban Water Conservation Best Management Practices (MOU), the District is firmly committed to the implementation of the Best Management Practices (BMPs) or Demand Management Measures (DMMs).

A diversified water supply portfolio is an important element in meeting long-term water reliability, and the District recognizes the need for local programs such as water conservation to diversify future investments. Using 1992 as a baseline, the District saved 50,600 AFY in 2010 which keeps us on track to meet our long-term goal of 98,500 AFY by 2030 from both passive and active water conservation. Table 5-1 illustrates the projected savings in five year increments.

Besides meeting long-term water reliability goals, water conservation programs help meet short-term demands placed on supply during critical dry periods. In June 2007, the District Board of Directors (Board) adopted a resolution calling for 10 percent voluntary conservation in recognition of 2007 dry conditions and the risk and uncertainties of imported water supplies caused by restrictive Sacramento Bay Delta (Delta) pumping.

In July 2008, the District initiated an ad-hoc water conservation drought response committee, comprised of representatives from the District, water retailers and cities, to develop conservation enhancements, water waste and enforcement options, and allocation strategies. The committee developed a model Water Conservation Ordinance that included both permanent water conservation features and the temporary measures triggered by drought or shortage. Many of these measures focus on outdoor water use since over 50 percent of a site's water use is for outdoor use (on average).

In 2009, with the State in its third consecutive dry year and continued court ordered pumping restrictions in the Delta, the Board adopted a resolution calling for 15 percent mandatory conservation. In 2010, based on increased allotment of our imported water supplies as well as an increase in local supplies, the Board switched to call for 10% voluntary. Water conservation education, outreach, and expanded programs and coordination with the cities and water retailers were key elements that were implemented to assist the public in meeting these goals.

Table 5-1 Total Water Conservation Program Water Savings Goal

Year	2010	2015	2020	2025	2030	2035
Water Conservation Savings Goal (AFY)	50,600	63,100	76,100	86,700	98,500	98,500
Notes: Total conservation savings goal includes both urban and agricultural conservation using 1992 as the base year.						

5.2 Implementation of Demand Management Measures (DMMs)

The District and its major water retailers enjoy a special cooperative partnership in the regional implementation of a variety of water conservation programs in an effort to permanently reduce water use in Santa Clara County.

In addition to the five water agencies which participate under the umbrella of the District, eight agencies have independently signed the Memorandum of Understanding (MOU). In 2008, the California Urban Water Conservation Council (CUWCC) updated the DMMs/BMPs, organizing them into five categories rather than fourteen. Foundational DMMs, which include Utility Operations and Education, are essential water conservation activities that all signatories to the MOU are required to implement. The other three DMMs are the Programmatic DMMs and include Residential; Commercial, Industrial, and Institutional (CII); and Landscape categories.

As the water wholesaler for Santa Clara County, the District is responsible for the implementation of the two foundational DMM's (see Appendix F for CUWCC BMP reports). By meeting CUWCC's reporting requirements, the District has been deemed eligible for grant funding from the State (Appendix G). However, as described in this section, the District has taken the lead in implementing various components of many of the other DMMs for both the water retailers that are signatories and those that are not. By taking the lead on these DMMs the District is assisting its retailers in meeting their SBX7 7 requirement to reduce per capita water usage 20% by 2020.

5.2.1 Foundational DMMs

DMM 1. UTILITY OPERATIONS PROGRAMS

1.1 Operations Practices

Conservation Coordinator (formerly DMM 12)
The District is implementing this in accordance with the MOU by having established the position of Water Conservation Coordinator in 1990. Current Conservation Coordinator information:

Name: Jerry De La Piedra
Title: Program Administrator – Water Conservation Unit
Address: 5750 Almaden Expressway, San José, CA 95118
Phone: (408) 265-2607 x2257
Fax: (408) 979-5639
E-mail: gdelapiedra@valleywater.org

Number of Conservation Coordinator Staff
There are three full-time staff members that report to the Water Conservation Program Administrator as well as 8 to 10 student interns (number varies depending on season and program needs).

Staff includes one senior water conservation specialist, one water conservation specialist, and one management analyst.

Water Waste Prevention (formerly DMM 13)
The District has limited authority to impose mandatory provisions restricting the wasteful use of water. As a wholesale water supplier, the District fulfills this DMM by developing a set of model water use restrictions in 1989 and 1993 to assist the water retailers and cities in the development of their water waste prohibitions. In 2009, the District worked closely with the cities and water retailers in its service area to develop a model Drought Response and Water Waste Ordinance (Appendix H). The District then worked closely with the cities and retailers to encourage adoption and enforcement of this model ordinance. Such restrictions, along with public outreach and education efforts, helped the county reach a water use reduction of roughly 19 percent from March 2009 through October 2010 (using 2004 as a baseline and adjusting for population growth). In 2010, the District once again worked closely with several cities and water retailers to develop an updated Drought Contingency Plan (Appendix I) for all water retailers in the county to consider when updating their 2010 UWMPs.

In addition, the District Act (Section 26.7) allows the District to impose proportional increases in groundwater production charges for groundwater pumping that exceeds a base period use, provided that a finding of drought and water shortage necessitates this imposition of increased charges. This provision allows the District to use financial disincentives to achieve cooperation on the part of groundwater producers, and is quoted below:

§ 26.7. Levy and collection of groundwater charges; rates; new or adjusted charges, reports; notice; hearing; errors

(C) The rate or rates, as applied to operators who produce groundwater above a specified annual amount, may, except in the case of any person extracting groundwater in compliance with a government-ordered program of cleanup of hazardous waste contamination, be subject to prescribed, fixed, and uniform increases in proportion to increases by that operator in groundwater production over the production of that operator for a prior base period to be specified by the board, upon a finding by the board that conditions of drought and water shortage require the increases. The increases shall be related directly to the reduction in the affected zone groundwater levels in the same base period.

Wholesale Agency Assistance Programs (formerly DMM 10)
This DMM defines a wholesaler's support role in terms of financial, technical, and programmatic assistance to its retail agencies implementing DMMs. The District continues to provide a high level of support and enjoys the special cooperative partnership with the water retailers in the regional implementation of the DMMs. The District meets regularly, through a water conservation subcommittee, with its water retailers to discuss hot issues (i.e. drought, ordinances, legislation, etc.), District efforts/programs, water retailer efforts, emerging technologies/practices, training/events, as well as CUWCC membership and benefits.

Since the District has a cooperative relationship with its retailers it does not provide monetary incentives directly to them. Instead, the District's Water Conservation Unit implements many of the MOU DMMs, provides technical resources when needed (i.e. assistance in calculating water savings, development of ordinances, internal/external reporting, etc), and offers training and workshop opportunities. See each individual DMM section in this report for the programs in place.

1.2 Water Loss Control (formerly DMM 3)

The District has operated a distribution system survey and leak detection program since 1991, thus fulfilled the DMM 3 – System Water Audits, Leak Detection and Repair. The Leak Detection Program is in the operation and maintenance of its wholesale treated water distribution and groundwater recharge systems. All facilities are 100 percent metered or gauged. The District's Leak Detection Program includes: 24-hour-per-day monitoring of meters on all major conveyance facilitates; daily flow records; monthly inspections; and water balances. Meters are calibrated regularly as part of the District's preventive maintenance program.

Flows in major facilities are monitored continuously with a SCADA system in the District's Operations Center, located at the Rinconada Water Treatment Plant and at each of the District's other two water treatment plants. Technicians and operators perform daily and monthly inspections. Daily, they record metered and gauged flows to verify system integrity. Monthly, the right-of-ways—in which facilities are buried—are inspected by helicopter for signs of leakage. Also monthly, an overall water balance and a treated water supply balance are conducted to establish and identify errors such as possible meter problems or distribution leakage. Our goal is to perform an investigation when the discrepancy is greater than 5 percent.

The District operates a facility for meter testing. Smaller meters up to 24 inches are tested based upon volume or time period. The program follows American Water Works Association (AWWA) standards. Larger meters are periodically tested volumetrically where feasible. All meters are regularly calibrated to manufacturer's specifications as part of the District's preventive maintenance program.

In addition, starting in 2009-2010, the District began to comply with the new BMP 1.2, Water Loss Control (formerly BMP 3) as amended September 16, 2009, which is detailed in the AWWA Manual for Water Supply Practices, M36: Water Audit and Loss Control programs (see Appendix J for completed FY 10 worksheets).

The Manual M36 offers tools to the water utilities and retailers to instill accountability and control losses. M36 has procedures and worksheets for each step of the water audit to detect apparent (nonphysical) and real (physical) losses. M36 offers a roadmap to control apparent losses in metering and billing and to recover missed revenues. It also has steps to implement a leakage and pressure management program to control real losses and preserve water.

1.3 Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections (formerly DMM 4)

On a monthly basis, the District meters and bills by volume of use all retail agency potable water supply deliveries. All municipal and industrial water users in the county are currently metered and were metered prior to the adoption of the MOU.

The District operates an aggressive water measurement program for both treated water deliveries and groundwater users. The current water measurement system measures 100 percent of all treated water deliveries, 95 percent of surface-delivered raw water deliveries, and 95 percent of all groundwater pumping. The remaining 5 percent (by volume) of groundwater pumping is done by small water users such as residential well owners. Although these residential wells are not metered, an estimate of water pumping or usage is made to determine the pumping fees. Because the cost of metering these customers would far outweigh the benefits, these customers' usage is estimated and they pay accordingly.

In addition, the District offers rebates for installation of submeters. This program, which began as a pilot program in FY 2001, gives a rebate of $100 for every water submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. During the pilot program 1,187 rebates were distributed. Water use records from participating mobile home parks showed an average water savings of 23 percent per mobile home. The program was extended and, in FY 2010, 1,740 more water submeters were installed; bringing the total for the program to 4,674. The District is also currently including rebates for switching from a mixed-use meter to a dedicated meter in its landscape rebate program. The District plans to continue these programs to meet the region's long-term water conservation goals.

DMM 2. EDUCATION PROGRAMS

2.1 Public Information Programs (formerly DMM 7)

The District conducts an extensive and comprehensive water conservation public information program, which includes general community outreach as well as more specific outreach to schools. The District's Communications staff is responsible for carrying out media relations and public outreach for the entire District, including water conservation, urban runoff pollution, water quality, groundwater recharge, water supply, water recycling, watershed and flood protection as well as stream stewardship. In addition, Water Conservation staff conducts targeted outreach designed to increase participation in individual conservation programs.

Outreach activities include multi-media marketing campaign directed at the diverse county population, website development and maintenance, publications, public meetings, District participation at community events, interagency partnerships, corporate environmental fairs, professional trade shows, water conservation workshops and seminars and a speaker's bureau.

Every year, the District carries out a multi-media campaign emphasizing the importance of water conservation. Until 2008, this multi-media campaign was carried out primarily during late spring and the summer months. In 2009, the newly developed Five-Year Water Conservation Marketing Plan recommended conducting a year-long campaign. This recommendation also coincided with the fact that in February 2009, the California Governor proclaimed a state drought emergency and requested that all urban water users reduce their individual water use by 20 percent. In response to continued dry conditions, in 2009 the District's Board of Directors called for 15 percent mandatory conservation. As a result, in 2009 and 2010, the District stepped up its efforts and the funding to carry out year-long campaigns.

In 2006, the District's water conservation campaign urged the community to conserve water under the theme "Save it while we've got it." The campaign recognized the winter's bountiful rainfall, but encouraged residents to conserve water during times of plenty for use when eventual drought conditions return.

In 2007, the weather turned dry and the campaign was carried out in two phases. The first phase focused on the message that the winter of 2007 was particularly dry. The second phase called for a 10 percent voluntary water-use reduction. Both phases encouraged local residents to schedule a Water-Wise House Call to learn ways they can save water. The second phase was initiated after the District Board of Directors called for a voluntary 10 percent reduction in water use due to the dry conditions and the restrictions on pumping from the Sacramento-San Joaquin Delta.

In addition to the District's own media campaign, the District participated in a regional conservation campaign in collaboration with San Francisco Public Utilities Commission, Contra Costa Water District, Bay Area Water Supply and Conservation Agency, Zone 7 Water Agency, and Bay Area Clean Water Agencies. The campaign, which was launched in July 2007, was called Water Saving Heroes. Through print, transit, billboards and radio ads, residents were encouraged to be a Water Saving Hero by taking simple but effective steps to conserve. Residents were linked to conservation programs and services they may be eligible for in their local area through a search feature on the campaign website. This partnership continued into the following year (2008).

As the year before, District's 2008 conservation outreach was organized in two phases. The first phase focused on the District's continued call for 10 percent voluntary conservation. The second phase, which ran March 2008 through June 2008, was limited to testimonial-style print ads.

In 2009, the District launched a new year-long campaign based on the recommendations of the new five-year water conservation marketing plan. In addition, the campaign was redesigned during the year following the District's Board of Directors call for 15 percent mandatory conservation in March 2009. To help the community achieve the immediate goal, the District launched a new conservation campaign—"For a better world…Save 20 gallons." The campaign was developed in partnership with the local cities, water retailers and county and had two specific goals:

- Reduce Santa Clara County water consumption by 15 percent
- Overcome key barriers to water conservation

"Save 20 gallons" was based on research (i.e. focus groups) that showed a water conservation campaign had to use a reduction target that was more tangible than a percentage and express it in a manner that is more user friendly. Therefore, "20 gallons" was chosen as an amount representing the 15 percent reduction in daily residential water use for the average individual. In addition, it was also important to quantify savings achieved through individual conservation tips, enabling the audience to calculate how to reach the desired daily savings of 20 gallons. As a result, the "Save 20 Gallons" campaign focuses on people's daily activities involving water use and quantifies the volumes of water that can be saved by making minor modifications to everyday behavior.

The multi-media campaign was carried out in English, Spanish, Vietnamese and Chinese languages. The District used a broad mix of media vehicles to combine high-reach and high-frequency media. Market research on media habits of target audiences called for moving away from old practices and increasing the utilization of vehicles where the audiences spend the most time– TV, radio and online. The online efforts included social messaging, updates to our website (www.valleywater.org), and development of a microsite (www.save20gallons.org). The websites are updated throughout the year to include the latest program information, the most recent ads, new reports/studies, updates on our workshops, and the addition of special features such as a tour of a virtual water conservation home. In addition, the District produced and distributed collateral material, including: program flyers, bookmarks, posters, restaurant signs for only serving water upon request, hotel signs encouraging the occupant to reuse their towels, static cling stickers for restroom mirrors, shower timers, and bill inserts.

In 2010, the District continued the "Save 20 gallons" campaign as a year-long effort. Total campaign budget and expenditures in FY 10 were just over $1.3M.

Additional Public Information Water Conservation programs are detailed below.

Water Conservation Report

Each year the District produces a year-end report (Appendix K) detailing its activities and accomplishments in water conservation.

Program Specific Marketing

In addition to the general "Save 20 gallons" media campaign mentioned above, the District also does various program specific marketing throughout the year. Efforts include sending postcards and/or letters with a promotional flyer to end-users, handing out program flyers and brochures at various events, and using point of purchase pieces for technologies such as high-efficiency toilets and washing machines.

Nursery Program

To increase the public's awareness of water-efficient gardening techniques, in 1995 the District developed the Nursery Program. This program distributes, at least quarterly, a series of educational materials to nurseries throughout the county. To display the materials, the program includes literature racks offering the free informational about water-wise gardening. The Nursery Program literature is currently being distributed to and displayed at roughly 20 participating nurseries.

Water Efficient Landscape Workshop Series

Each spring, the District hosts its Water-Efficient Landscape Workshop Series for county residents. The series consists of four consecutive class sessions addressing topics such as garden design, plant selection, irrigation design, installation and maintenance techniques and gardening with native species. The series draws approximately 150 - 200 attendees each year.

Spanish-Language Irrigation Workshop Series

These workshops provide hands-on training to English- and Spanish-speaking landscape professionals on irrigation controller programming, system scheduling, and irrigation trouble-shooting. In each class of approximately 40 landscape professionals are those who collectively maintain around 400 sites in the county.

Water-Wise Gardening CD-Rom

In FY 2005 the District developed an interactive CD-ROM that showcases over 1,000 native, drought tolerant and water-efficient plants and features the District's landscape design brochure "Rules of Thumb for Water-Wise Gardening". Through features such as the "Garden Tours" and "Garden Gallery", users can view plants in beautiful, well established gardens and click on them to learn about each plant's water, sun, and soil requirements. Users also have the option of searching the "Plant List" database by scientific and common name or by a plant's unique characteristics. These reports can be printed (to attain the plant's photo). The user can then take this specific plant information to local nurseries and make water-efficient choices.

Bill Inserts

In the fall of 1999, the District developed a bill insert promoting the reduction of landscape water use by reminding homeowners to cut back on their watering schedule during the fall and winter months. In collaboration with the District's water retailers, this insert has been mailed each year in October/November. In addition to the fall insert, the District has developed spring and summer bill inserts and worked with the Santa Clara County cities and retailers to distribute these inserts.

Community Events

Each year the District participates in numerous community events, including environmental fairs, Earth Day events, garden tours, and many others. District staff distributes multiple educational materials and program flyers. Below are a few examples (see Appendix K for full list):

- Spring Garden Fairs
- Santa Clara County Home and Garden Show
- City of Cupertino Earth Day Fair
- Green Plumbers Workshop
- Silicon Valley Water Conservation Awards
- Native Garden Tour

Water Wise Gardens Display

2.2 School Education Programs (formerly DMM 8)

This DMM requires water suppliers to implement a school education program that includes providing educational materials and instructional assistance. In 1995 the District's Public Information Office hired a full-time, fully credentialed educator who holds life-time teaching and Administrative Services credentials to coordinate the school education programs. This included developing school programs, contracting with the Youth Science Institute for additional instructors, and supervising university student interns as classroom assistants. From 2001-2007, a second, bilingual educator joined the District's full-time staff to assist with the program.

The District has been continuously active in this area by providing free classroom presentations, puppet plays, and tours of District facilities to schools within the county. The objective is to teach students about water conservation, water supply, watershed stewardship, and flood protection. The District also provides school curricula to area educators, including workbooks and videos, as well as hands-on training for teachers. In FY 10, over 11,200 kindergarten through 6th grade and 221 7th grade through 12th grade students were reached. The District completed 476 classroom presentations, with over 10,600 students attending. In addition, the District staffed an education booth at 2 events with roughly 400 attendees. The annual budget for the FY 10 program was $215,000. The goal of the program this year is to reach 12,000 students, ranging from pre-kindergarten through college.

Materials distributed to students included topical lessons. All meet state education framework requirements and are grade-level appropriate. All students who participated in the program received materials.

5.2.2 Programmatic DMMs

As previously mentioned, the District and its major water retailers enjoy a special cooperative partnership in the regional implementation of a variety of water conservation programs. As the water wholesaler for Santa Clara County, the District is responsible for the implementation of the two foundational DMM's, however it is also implementing multiple components of many of the other DMMs.

To determine compliance of the Programmatic DMMs, water retailers have the option of accomplishing the specific target for each DMM, implementing measures from a flex track menu that achieve equal or greater savings if implementing the DMMs, or achieving set water savings goals measured in gallons per capita per day consumption. Participation in all programs listed below is tracked by water retailer on a monthly basis. In addition, the District has sent out (and will continue to in the future) customer surveys to determine overall satisfaction with a program and to see how a program may be improved.

The District will continue to work with its water retailers to implement the programs that best meet the public's needs while achieving the local, regional, and state-wide goals.

DMM 3 RESIDENTIAL

3.1 Residential Assistance Program (formerly DMM 1 and 2)

3.2 Landscape Water Survey (formerly DMM 1)

As the administrator of this program, the District develops and implements a strategy to target and market water-use surveys to single-family and multi-family residential customers throughout Santa Clara County, except for San Jose Water Company's service area as they administer their own program. Since 1998, the District has performed more than 29,600 residential audits, including more than 2,000 in FY 2010.

High-Efficiency Shower Head

The District's program, which began in July of 1998 as a pilot program, includes educating the customer on how to read a water meter; checking flow rates of showerheads; faucet aerators and toilets; checking for leaks; installing low-flow showerheads, aerators and/or toilet flappers if necessary; checking the irrigation system for efficiency (including leaks); measuring landscaped area; developing an efficient irrigation schedule for the different seasons; and providing the customer with evaluation results, water savings recommendations, and other educational materials. In 2004, the District began programming a homeowner's controllers as well (i.e., if allowed by the homeowner, the surveyors will input the recommended schedules into the controller).

The District's largest retailer, the San José Water Company, (SJWC) offers water audits, free of charge, to all of its customers. The audits are performed at customer request, typically in response to a high water bill concern and/or in response to SJWC or District marketing efforts. Audits are performed for both residential and commercial customers. The District supports SJWC's water audit program by providing free water conservation supplies, such as showerheads and faucet aerators. SJWC began performing water audits at the end of 1991 and is estimated to have completed over 24,000 audits since the program began.

During SJWC's audit, water meters are read and timed for water usage, and an examination is performed throughout the household to identify any water leaks. In addition to the indoor audits, SJWC further developed the landscape component of their audit program in 1994 to provide an extensive evaluation of the resident's landscape irrigation system. Through this program, residents are also trained on how to efficiently program their irrigation controllers.

Each year these programs are promoted countywide through a summer media campaign which typically includes television, radio, and print ads. The District plans to continue its program to meet the region's long-term water conservation goals.

The District also distributes high-quality, low-flow showerheads and faucet aerators to single-family and multi-family residents through the water retailers and public events. Since program inception in 1992, more than 296,000 low-flow showerheads and aerators have been distributed throughout the county, including more than 22,000 in FY 2010.

The District plans to continue offering free showerheads and aerators through its Water-Wise House Call Program, its water retailers, and through various outreach events.

3.3 High-Efficiency Clothes Washer (formerly DMM 6)

The District has offered a residential high-efficiency washer rebate since July of 1995.

In October 2001 the District began participating in the regional Bay Area Water Utility Clothes Washer Rebate Program which has been successfully partnering with PG&E since January 2008. In 2010 the District and PG&E offered a combined rebate of $175 ($50 from PG&E, $125 from the District) for clothes washers in the Consortium for Energy Efficiency's Tier 3, the most water-efficient category.

The District has given out more than 109,000 rebates since the program began in 1995 (16,559 in FY 2010) and will continue to offer this program in the future in order to reach the region's long-term water conservation goals.

3.4 WaterSense Specification Toilets (formerly DMM 14)

This DMM calls for the implementation of programs for replacing existing high water using toilets with WaterSense toilets in single-family and multi-family residences. The program must result in water savings equivalent to having an ordinance requiring toilet replacement at time of home resale. From 1992 through June 2003, the District, in conjunction with each of the 13 participating retailers and through a series of cost-sharing agreements with the City of San José and the City of Sunnyvale, has provided incentives for the retrofit of approximately 244,000 residential toilets. Because of this, and as reported in our 2005 UWMP, the District has already met the original DMM cumulative water savings target.

Although the District has already completed the original DMM, in 2004 the District shifted to a high-efficiency toilet (HET) program. The current program, which only includes WaterSense HETs, consists of a rebate program for single-family and multi-family accounts and a full-installation program for multi-family accounts. Through 2010 the District has rebated and/or installed more than 7,700 single-family HETs (3,463 in FY 2010) and more than 8,000 multi-family HETs (1,970 in FY 2010). To meet the region's long-term goals the District will continue to implement HET programs in the future.

DMM 4. COMMERCIAL, INDUSTRIAL & INSTITUTIONAL (FORMERLY DMM 9)

During FY 1996/97, the District implemented a regional pilot program that provided 24 water-use surveys for large water-using businesses and industries in the county. For the past six years, the District has offered comprehensive CII surveys—including cost/benefit analysis for all recommendations—to businesses within Santa Clara County. The District's largest retailer, San José Water Company, has been offering commercial water-use surveys since 1994.

Since FY 2003/04, approximately 440 comprehensive CII water use surveys were completed by the District (136 in FY 2010). However, rather than focusing on surveys to meet the requirements of this DMM, the District has been implementing several water-saving programs over the last 10 to 12 years, including:

4.1 Water Efficient Technologies Program (WET)

To encourage all commercial and industrial businesses to implement permanent water reduction measures, the City of San José offers financial awards to businesses in San José, offering $4 for every CCF conserved. Rebates range from $400 to $50,000 per site. Since 1997, the District and the City of San José have entered a cost-sharing agreement to jointly fund this program in the treatment area of the San José/Santa Clara Water Pollution Control Plant. Additionally, the District has expanded this program countywide. To date, the District has funded (either entirely or through cost-sharing with the City of San José) 84 projects saving approximately 613,000 CCF/year. The District will continue to offer this program in the future in order to reach the region's long-term water conservation goals.

4.2 Commercial Toilet and Urinal Program

The District has been replacing inefficient toilets in CII sites since 1994. An ultra low flush toilet (ULFT) rebate program was offered from 1992-1999. In 2000, the District switched to a direct installation program. Additionally, the District reimbursed the City of San José for toilets replaced through their CII ULFT programs. From 1994 through 2005, more than 8,700 ULFTs were installed through District funded programs.

In FY 05, the District switched to High-Efficiency Toilets, or HETs, that flush at 1.28 gallons per flush or less. Since 2005, more than 9,000 HETs have been installed (1,679 in FY 2010). The District also recently initiated a urinal program to replace flush valves of old inefficient urinals that flush 1.0 gallon or more with a flush valve that uses only 0.5 gallons per flush. Since 2007, approximately 400 urinals had been retrofitted (328 in FY 2010). The District has offered two types of programs for both high-efficiency toilets and urinals, a rebate program and a free installation program. The District will continue to offer this program in the future in order to reach the region's long-term water conservation goals.

4.3 Commercial Washer Program

In July, 1999, the District, with funding partners Silicon Valley Power (supplier of electricity to customers within the City of Santa Clara) and the City of San José (administers Santa Clara/San José Water Pollution Control Plant), began offering a rebate for the replacement of high-efficiency clothes washers in Laundromats. Beginning in July, 2000, the commercial washer program was expanded throughout the county and now includes commercial machines installed in multi-family complexes. More than 3,400 washers have been rebated since 1999, including 367 in FY 2010.

In July 2010, the District began issuing rebates only for those machines in the highest tier of water efficiency. This will not only encourage the use of more efficient machines, it will be consistent with the requirements of PG&E's washer rebate programs. The District will continue to offer this program in the future in order to reach the region's long-term water conservation goals.

In addition to the programs mentioned above (WET, CII ULFTs/HETs, CII Washers) the District is implementing several other CII programs, including:

Pre-Rinse Spray Valve Program

In previous years the District partnered with other agencies to offer a direct install program for pre-rinse sprayers. In FY 2010 the District purchased a quantity of high-efficiency pre-rinse spray valves with a flow rate of 1.15 gallons per minute for distribution to commercial sites, especially those identified through the District's CII Water Survey Program. A total of 25 of these sprayers were distributed in FY 2010, and more than 4,300 since the District began promoting these devices in FY 2003.

Submeter Rebate Program

This program, which began as a pilot program in FY 2001, gives a rebate of $100 for every water submeter installed at multi-family housing complexes, such as mobile home parks and condominium complexes. During the pilot program, 1,187 rebates were distributed. Water use records from participating mobile home parks showed an average water savings of 23 percent per mobile home. The program was extended in FY 2008 and, in FY 2010, 1,740 more water submeters were installed, bringing the total for the program to 4,674.

DMM 5 LANDSCAPE

This DMM calls for agencies to assign reference evapotranspiration-based (ETo) water use budgets to accounts with dedicated irrigation meters, provide water-use surveys to accounts with mixed-use meters, and offer financial incentives to support the water budgets and surveys.

5.1 Landscape Surveys

Since 1995, the District has offered and provided large landscape water audits to sites in the county with one acre or more of landscaping. Landscape managers have been provided water-use analyses, scheduling information, in-depth irrigation evaluation, a site-specific water budget, and recommendations for affordable irrigation upgrades. Each site receives a detailed report upon completion of the audit. An annual report is generated to recap the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database. In 2009, the program was expanded to include sites with 5,000 square feet or more of irrigated landscape.

The Landscape Survey Program reaches the community through advertising in Tri-County Apartment Association's monthly Apartment Management magazine, colorful flyers at the biannual Home & Garden Show, NCTLC Turf & Landscape Expo, and retailer outreach through direct mailing of personalized letters to high water use customers and also through city newsletters and business newsletters.

This highly successful and well-received program has conducted nearly 1,300 audits through 2010 (94 were completed in FY 2010). The District will continue to offer this program in the future in order to reach the region's long-term water conservation goals.

5.2 Water Budgets

The District's staff is currently working on a comprehensive program to develop ETo-based water use budgets for all large landscape sites by using aerial images and GIS techniques.

The project has acquired multi-spectral images of over 900 square miles of Santa Clara County, performed image analysis (classification) to identify the areas of turf, other landscaping, water features, bare ground and hardscape for each parcel (site) and has prepared a database of these areas to support Landscape Water Budgets as well as support the Landscape Survey Program.

Concurrently, the District is developing a database-backed website (Water Budget Manager) to deliver real-time Landscape Water Budget information to property and landscape managers via the Internet. The District will routinely update each budget using ETo data from the California Irrigation Management Information System (CIMIS) so that the budgets reflect actual site irrigation demands during the most recent billing cycle. It is projected that these Landscape Water Budgets will reduce water use for these sites by at least 10 percent (or 5,000 AF per year for the entire county).

The District will continue to offer surveys to sites that are found to be over-budget. This tool is scheduled to be available in 2011.

5.3 Financial Incentives

In 2006, the District partnered with five bay area water supply agencies and received a Department of Water Resources Proposition 13 grant that provided funding for the installation of weather-based irrigation controllers (WBICs). This new generation of irrigation controller utilizes the principals of evapotranspiration or "ET" to automatically calculate a site specific irrigation schedule based on several factors, including plants and soil type. The controller then adjusts the irrigation schedule as local weather changes to regulate unnecessary irrigation.

The District first implemented a direct install program which installed two types of WBICs (real time and historic) in both residential and commercial sites throughout the District's service area. In order to expedite program participation and include emerging WBIC manufacturers, the District shifted the WBIC program to a rebate style program that offered rebates of $300-$1,100 per approved controller installed. More than 1,000 WBICs have been installed through 2010 (142 were installed in FY 2010).

The District expanded its irrigation equipment incentives beyond the WBIC program, when two grants were received in 2006 for the implementation of two types of water efficient irrigation hardware installation rebates programs.

The first grant, received from California Department of Water Resources, kicked off implementation of the Irrigation System Hardware Rebate Program (ISHRP). This program aimed to install a variety of water efficient irrigation hardware at commercial, industrial, and institutional sites throughout Santa Clara County. Through ISHRP, the District provided rebates ranging from $200 to a maximum of $2,000 per site (not to exceed 50 percent of the hardware cost). Qualifying hardware included: rain sensors, high distribution uniformity nozzles, dedicated landscape meters, replacement sprinkler heads, converting overhead irrigation to drip, pressure reducing valves, and spray heads or rotors with pressure compensating heads and/or check valves. From October 2006 through June 2010, 46 ISHRP rebates were issued.

The second water efficient irrigation equipment grant was received from the United States Bureau of Reclamation and was to launch the Residential Irrigation System Hardware Rebate Program (RISHRP). The program was designed to retrofit inefficient irrigation equipment at residential sites with new water conserving equipment. This residential version of the ISHRP program offered rebates for the same efficient irrigation equipment but was unique as RISRHP offered flat rebate amount per equipment items. Through the RISHRP program, residents could receive rebates ranging from $50 up to $1,000 per site. From September 2006 through June 2010, 228 RISHRP rebates were issued.

In addition to efficient irrigation equipment retrofits, the District began to focus on water efficient landscapes by launching the Water Efficient Landscape Rebate Program (WELRP) in early 2005. The WELRP program offered rebates to residential and commercial sites for the replacement of approved high water using landscape with low water use plants, mulch and permeable hardscape. WELRP participants could receive up to $0.75 per square foot of irrigated turf grass with a maximum of rebate of $1,000 and $10,000 for residential and commercial sites respectively. In an effort to expedite program participation, District's Board of Directors moved to double the maximum rebate from $1,000 up to $2,000 for residents and from $10,000 up to $20,000 for commercial sites in March 2009. There were 606 WELRP rebates issued from January 2005 through June 2010.

In the midst of three consecutive dry years from 2007 through 2009, the District's Board of Directors made a call for 15 percent mandatory water conservation in March 2009. In an effort to assist in meeting this call by expediting program participation and water savings, the District's Landscape Survey Program (LSP) was expanded to include any commercial, industrial, institutional site with 5,000 sq ft or greater of irrigated landscape. This new program was designed to serve not only as an informative landscape survey but to act as a pre-inspection for all commercial landscape rebate programs. In addition to the changes to the LSP, the four District landscape rebate programs (WBIC, ISHRP, RISHRP and WELRP) were combined into one new program, the Landscape Rebate Program. This new program offers rebates for both high-efficiency landscape conversion and for the installation of efficient irrigation equipment for residential and commercial sites. The District will continue to offer these programs in the future in order to reach the region's long-term water conservation goals.

5.3 Conclusion

The District, through a unique cooperative partnership with its retailers, offers regional implementation of a variety of water conservation programs in an effort to permanently reduce water use in Santa Clara County. Although the District is only responsible for implementation of the Foundational DMMs, it continues to collaborate with its water retailers to implement various water conservation programs on a regional basis. By taking the lead on implementing many of the various DMM components, the District is ensuring its long-term water supply reliability goals are met as well as assisting its water retailers in meeting their goals, including compliance with recent legislation calling for 20 percent reduction in per capita water use by 2020.

The District's urban demand management measures are estimated to save more than 92,000 AFY by the year 2030, using 1992 as a base year. Combined with 6,000 AFY in savings from agriculture water conservation, the total of nearly 100,000 AFY by 2030 accounts for almost 20 percent of pre-savings demand and is a crucial water supply management program, now and into the future.

This page intentionally left blank.

6

2010 URBAN WATER MANAGEMENT PLAN

Chapter 6.0 | Water Shortage Contingency Planning

This chapter describes the development, actions and implementation of the District's water shortage contingency plan. In addition, information related to a three dry year scenario, mandatory prohibitions, penalties or charges for excessive use, revenue and expenditure impacts, mechanisms to determine reductions in water use and catastrophic interruption planning is provided. Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist items 37 through 42.

6.1 Water Supply Strategy

Overall, the District manages water supplies and programs to maximize storage of wet period supplies for use during dry periods when other sources of supply are deficient. Because the groundwater basins are able to store the largest amount of local reserves, the District depends on maintaining adequate storage in the basins to get through extended dry periods.

In addition to working with retailers and cities to manage water use during shortages, the District augments supplies by investing in supplemental supply sources. The District has a long term agreement with Semitropic Water Storage District in Kern County that allows the District to store up to 350,000 AF of imported water supplies in Semitropic's groundwater basins for District use in dry years. During prolonged dry periods, the Semitropic banking program provides a significant supplemental supply to draw upon. Other options may be available in any given year such as transfers, exchanges, spot markets, and the State Drought Bank. The decision on when and in which sequence supply will be utilized during different stages is managed by annual operations and planning and includes consideration of availability and cost.

6.2 Water Shortage Contingency Plan Objectives

The water shortage contingency plan stages and water use reduction targets were developed by the District consistent with water supply objective 2.1.1 "…maintain the groundwater basins for reliability" and in consideration of the following water shortage management objectives:

- Minimize economic, social, and environmental hardships to the community caused by water shortages. As water becomes more scarce and the community is faced with increasing cutbacks, the costs of shortage rise and the risk of lasting damages to residences, businesses and the environment increases. Taking this into consideration, the timing and stages of shortage actions are designed to limit and to avoid having to call for more than a 20 percent reduction in water use in any given year of an extended dry period.

- Establish water use reduction targets, manage supplies and work closely with retailers and cities in developing efficient and effective demand reduction measures that concentrate on eliminating non-essential uses first.

- Maintain and safeguard essential water supplies for public health and safety needs. The water shortage contingency plan anticipates and accounts for water supply shortages due to acute catastrophic events. The District's water supply system is vulnerable to several disaster scenarios including a loss of imported supplies due to a Delta levee outage, an interruption of San Francisco's regional water system deliveries to Santa Clara County, and/or a major earthquake.

6.3 Water Shortage Contingency Plan

This section describes the District's contingency planning for actions that can be taken should water shortages occur, including up to a 50 percent reduction in water supplies. The plan provides a strategy for early water shortage detection, shortage stages, shortage response actions, and a public outreach and communication plan. A water shortage occurs when water supplies available to the District are insufficient to meet water demands. Water supply shortages can occur for a variety of reasons including droughts (hydrologic or regulatory), loss in ability to capture, divert, store, or utilize local supplies, and/or facility outages.

The purpose of contingency planning is to be prepared ahead of time and to establish actions and procedures for managing water supplies and demands during water supply reductions and water shortages. An important component of meaningful shortage response is the ability to recognize a pending shortage before it occurs, early enough so that several options remain available and before supplies that may be crucial later have not been depleted.

In any given year many factors and events can and do affect water supply availability. Staff has determined that projected end-of-year groundwater storage serves as an early warning sign and a good indicator of potential water shortages since this value also accounts for surface water supplies as these supplies either directly or indirectly contribute to total projected groundwater storage.

While the District manages the groundwater basin, groundwater in the county is pumped by others including major water retailers, private well owners, and agricultural users. The District can influence groundwater pumping through financial and management practices, but it does not directly control the amount of groundwater pumped. Therefore, to execute effective responses to a water shortage, the District works closely with groundwater users, cities, and water retailers to plan and coordinate water shortage contingency activities. A key part of developing the water shortage contingency plan was the engagement of water retailers, cities, and District advisory committees.

6.3.1 Water Shortage Actions

This section describes the five-stage approach and overall strategy for dealing with water shortages. The water shortage contingency actions are summarized in Table 6-1. When water supplies available to the District are insufficient to meet current demands, the District considers augmenting supplies based on available options. When the District Board calls for short-term water conservation, the cities and water retailers consider the implementation of their water contingency plan actions identified in their Urban Water Management Plans in order to achieve the necessary shortage response. Water shortage resolutions passed by the District Board in 2009 and 2010 are included in Appendix L. Implementation actions to achieve the desired shortage response may be different for each city/water retailer depending on service area composition (commercial, industrial, residential) and source of water supplies. However, some actions are common to several of the cities/water retailers, providing for more consistent implementation and messaging.

Reducing water consumption during a water shortage is generally achieved through increased education leading to behavioral changes (e.g., shutting off the water while brushing one's teeth) and water use restrictions (e.g., yard irrigation only allowed two days a week). These water savings are considered short term water conservation and are distinct from long term on-going conservation programs.

Stage 1

In Stage 1, the District continues ongoing outreach strategies aimed toward achieving long-term water conservation goals. Messages at this stage focus on services and rebate programs the District provides to facilitate water use efficiency for residents, agricultural operations and businesses. While the other stages are more urgent, the need for successful outcomes in Stage 1 is vital to achieving long-term water use reduction goals.

Stage 2

Communication tactics that are employed in Stage 1 may be augmented with additional funding to reach more people with an increased frequency and urgency. Additional communication tools can be employed to further broaden awareness and promote immediate behavioral changes. Specific implementation plans will be developed when a worsening of the water shortage condition has occurred. Supplemental funding may be identified to augment budgeted efforts, which normally will be set based on an assumption that the county is in Stage 1. Based on historical hydrology and management and operations of District supplies, it is estimated that groundwater storage would be in Stage 2 one out of every ten years.

Stage 3

As the severity of a water shortage increases, the intensity of communications efforts may also increase. Messages are modified to reflect the more dire circumstances. The messages conveyed change to correspond to the call for immediate actions to save water. Based on historical hydrology and management and operations of District supplies, it is estimated that in one out of every 15 years groundwater storage would be in Stage 3.

Stage 4

This is the most severe stage and retailers and cities would be encouraged to enforce their water shortage plans which could include fines for repeated violations. Stage 4 strengthens and expands the Stage 3 activities including further expansion of outreach efforts and opening a drought information center.

Stage 5

Stage 5 of the water shortage contingency plan designates and reserves up to 150,000 AF in surface and groundwater storage for emergency conditions to ensure availability of water to meet essential public health safety requirements.

Table 6-1 Water Shortage Contingency Plan

Stage	Stage Title	Projected GW Reserves	Response	Suggested Reduction in Water Use[1]	Communication and outreach effort
Stage 1	Normal	Above 300,000 AF	Continue regular outreach activities in this stage to promote ongoing implementation of conservation and implementation of BMPs.		• Maintain public information and outreach focused on long term, ongoing conservation actions (e.g., water saving appliances, repairing leaks, and low-water use landscaping).
Stage 2	Alert	250,000 to 300,000 AF	This stage is meant to warn customers that current water use is tapping into groundwater reserves – a signal that groundwater levels are dropping to meet demands. Communications are needed to set the tone for the onset of shortages. Request water users to reduce water use by as much as 10%. Coordinate ordinances with cities and warn and prepare for a stage 3 situation.	0-10% demand reduction	• Expand on Stage 1 efforts • Intensify public information and advertising campaign • Focus messages on shortage situation and immediate behavioral changes
Stage 3	Severe	200,000 to 250,000 AF	Shortage conditions are worsening, requiring close coordination with retailers and cities to enact ordinances and water use restrictions. Requires significant effort and behavioral change by water users. Increase outreach campaign to save water.	10-20% demand reduction	• Expand and intensify Stage 2 activities • Further expand outreach efforts • Modify messages to reflect more severe shortage condition and need for immediate behavioral changes
Stage 4	Critical	150,000 to 200,000 AF	This is the most severe stage in a multiyear drought. Encourage retailers and cities to enforce their plans which could include fines for repeated violations.	20-40% demand reduction	• Strengthen and expand Stage 3 activities • Further expand outreach efforts • Open drought information center
Stage 5	Emergency	Below 150,000 AF	This last stage is meant to address a more immediate crisis such as a major infrastructure failure. Water supply would be available only to meet health and safety needs.	Up to 50% demand reduction	• Daily updates on water shortage emergency (media briefings, web update, social media outlets) • Activate EOC

Notes:

(1) When the District Board calls for short-term water conservation, the cities and water retailers will consider the implemention of water contingency plan actions identified in their Urban Water Management Plans in order to achieve the necessary shortage response. The District works with the water retailers and cities to help coordinate these activities.

6.4 Three Dry Years Scenario

This section presents an estimate of the water supply available during each of the next three years (2011 – 2013), assuming a repeat of the driest three-year historical hydrologic sequence. Minimum total available supplies (including both local and imported supplies) for a consecutive three year sequence occurred in the years 1988 through 1990. Table 6-2 summarizes the water supply that could be expected in a repeat of those three years.

Year-to-year decision making is accomplished through annual operations planning activities, which include evaluating annual transfer opportunities, allocating imported water deliveries, setting carryover storage targets, and scheduling facilities maintenance decisions. Developing a resource strategy that balances both cost and risk requires a combination of core and flexible supplies. Examples of flexible supplies include water transfers, banking, and storage.

As Table 6-2 shows, the District would need to draw down carryover storage by approximately 194,900 AF in order to meet full demands over the next three years assuming the next three years were a repeat of the driest three-year historical hydrologic sequence. Based on current groundwater conditions at the start of 2011, a 10% demand reductions for each of the next three years would be recommended.

Table 6-2 Water Supply Estimates for the Driest Three-Year Sequence (AF)

Water Supply Sources	Year 1 Hydrologic Year 1988	Year 2 Hydrologic Year 1989	Year 3 Hydrologic Year 1990
Imported Water			
SWP[1]	47,400	58,800	26,300
CVP[1]	69,000	105,900	76,100
Semitropic take & transfers	39,700	34,000	39,700
SFPUC to common retailers[2]	52,600	52,600	45,700
Subtotal:	208,700	251,300	187,800
Local Supplies			
Natural groundwater yield	44,100	45,500	51,000
Surface supplies	29,000	21,600	19,400
Other local	3,400	6,900	4,400
Recycled water	15,000	16,500	18,000
Subtotal:	91,500	90,500	92,800
Total Supply:	300,200	341,800	280,600
Estimated demand	370,000	372,500	375,000
Annual decrease in carryover storage[3]	69,800	30,700	94,400
		Total decrease in carryover storage:	194,900

Notes:
(1) Includes supply allocation transfer/exchange, rescheduled and carry-over storage
(2) Based on "Procedure for Pro-Rata Reduction of Wholesale Customers' Individual Supply Guarantees" under 2010 demand conditions and Tier Two Allocations calculation spreadsheet provided by BAWSCA.
(3) Initial conditions set to end of calendar year 2010

6.5 Mandatory Prohibitions and Penalties for Excessive Use

As an on-going practice, the District collaborates with cities, the county, retail water suppliers and stakeholders in developing and implementing water management programs to conserve and prevent waste.

The District Board of Directors has the authority to adopt resolutions and ordinances as formal procedures to take action on matters of significance. For instance, the District may take action to prevent the waste of water as part of the overall effort to protect and manage water resources for beneficial uses. It is a misdemeanor for any person to violate any District ordinances. Violations are punishable by fine or imprisonment or both.

6.6 Revenue and Expenditure Impacts

Under a water shortage scenario, District expenses are anticipated to increase as a result of actions to augment water supply and reduce use. Revenue would decrease as a result of reduction in water sales. The District maintains supplemental funds in its financial reserves to help pay for increased expenditures to remedy shortages. These funds need to be replenished in subsequent years however, through groundwater production charges and treated water charges. The FY 2011 budget for the supplemental waters supply reserve is $7.7M and is projected to grow to roughly $11.7M by FY 2021. The minimum for this reserve is 20 percent of the annual water purchase budget. The District may decide to impose or adjust its adopted groundwater production charges mid-way through the fiscal year. This allows the District to react to unanticipated changes in expenditures or revenue in a timely fashion.

6.7 Mechanism to Determine Actual Reduction in Water Use

In times of shortage, staff will intensify its monitoring and evaluation of the following activities:

- Monthly and season-to-date rainfall at four rainfall stations within the county
- Reservoir storages
- Monthly recycled water deliveries
- Monthly and year-to-date water use for each major water retailer in the county
- Groundwater basin conditions
- Current retailer water use compared to a desired decrease in use

Note that not all water use data is available on a monthly basis. For example, many small well owners report their water usage on a 6 month cycle. In some cases there is a two-month time-lag from when the water is used and reported. Not all water use is metered and estimates are used in these situations. Finally, the District does not have access to individual water use account data that would enable it to determine the reductions by customer class or by customer unit (per household, for example). This data is only available at the retailer level.

6.8 Catastrophic Interruption Planning

6.8.1 Water Infrastructure Reliability Project

In 2003, the District initiated the Water Utility Infrastructure Reliability Project (IRP) to determine the current reliability of its water supply infrastructure (pipes, pump stations, treatment plants) and to appropriately balance level of service with cost. The project measured the baseline performance of critical District facilities in emergency events and identified system vulnerabilities. The study concluded that the District's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. Less severe hazards, such as other earthquakes, flooding and regional power outages had less of an impact on the District, with outage times ranging from one to 45 days.

The level of service goal identified for the IRP was "Potable water service at average winter flow rates available to a minimum of one turnout per retailer within seven days, with periodic one day interruptions for repairs." In order to meet this level of service goal, the project developed seven portfolios to mitigate the identified system risks, and identified a recommended portfolio for implementation. As a result, the District has been implementing the recommended portfolio of reliability improvement projects (Portfolio 2). The cost to implement Portfolio 2 is estimated to be approximately $175 Million. Portfolio 2 is expected to reduce the post-earthquake outage period from 45-60 days to 7-14 days.

In 2007, the District created a stockpile of emergency pipeline repair materials including large diameter spare pipe, internal pipeline joint seals, valves, and appurtenances. The stockpile marks a significant increase in reliability of the District's water supply system, as it helps to reduce outage time following a large earthquake from approximately 60 to 30 days. The District still needs to complete several other emergency planning projects to meet the goal of reducing outage time to 30 days. These include developing a post-disaster recovery plan, developing mutual aid agreements or expanding participation in CalWARN, setting up contractor, welder, and equipment rental company retainer agreements, and setting up post-earthquake pipeline inspection teams.

The addition of groundwater wells and line valves to the District's system will further reduce outage time following a large earthquake, from 30 days down to 14 days. The wells will allow the District to convey 72 MGD of supplies from the groundwater basin to the treated water pipelines following a hazard event. 72 MGD represents the average winter demand of the treated water retailers, and is the quantity needed to meet the project's level of service goal. The line valves will allow the District to isolate damaged portions of pipelines. The well field project is the most costly of the Portfolio 2 projects, estimated at $116 million. The District's Board recently approved cutting the project budget to $80 million. Staff has not determined the impacts of this cut on the program and outage time estimates.

6.8.2 Office of Emergency Services

Office of Emergency Services (OES) coordinates emergency response and recovery for the District. During any emergency, the District continues the primary missions of providing clean, safe water and flood protection to the people of Santa Clara County. OES ensures that critical services are maintained and emergency response is centralized. OES maintains a full-time professional emergency management staff trained and equipped to respond quickly at any time of day or night to support and coordinate more than 170 Santa Clara Valley Water District Emergency Operations Center (EOC) and field responders. Over 150 members of the water District staff have completed the specialized California Standardized Emergency Management System/National Incident Management System (SEMS/NIMS) training. More than 100 of those individuals have taken advanced EOC action planning training.

6.8.3 Emergency Operations Center

The Emergency Operations Center (EOC) is connected to other agencies and jurisdictions by an array of telecommunications, two-way radio, satellite telephone, and wireless messaging systems. In addition, two response vehicles with many of the same communications capabilities of the EOC enable staff to establish mobile emergency command posts just about anywhere field operations may require.

OES maintains communications with local, state and national emergency management organizations and allied disaster preparedness and response agencies.

OES partners include the following:

- Emergency management offices of Campbell, Cupertino, Gilroy, Los Altos, Los Altos Hills, Los Gatos, Saratoga, Milpitas, Monte Sereno, Morgan Hill, San José, Santa Clara, Mountain View, Palo Alto, and Sunnyvale.
- County offices of emergency services including Santa Clara, Monterey, San Benito, Santa Cruz and San Mateo.
- State emergency management organizations including the Governor's Office of Emergency Services, California Office of Safety Dams and California Department of Water Resources.

7

2010 URBAN WATER MANAGEMENT PLAN

Chapter 7.0 | Water Recycling

This chapter provides a description of the water recycling systems within Santa Clara County, current and projected wastewater quantity, quality and current use, and discusses potential and projected uses of recycled water. Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist items 44 through 51.

Recycled water is a multi-beneficial water resource. Recycled water is not only locally available, but it is also available in dry years and is relatively immune from changes in hydrology. Using recycled water can reduce the energy needed to convey water into the county from places faraway such as the Delta, thereby giving recycled water a "green" footprint. The Board water supply policy goal 2.1.5 is to "protect, maintain and develop recycled water."

South Bay Water Recycling Program Recycled Water Pump Station

7.1 Water Recycling Systems

In Santa Clara County, recycled water is developed by the county's four wastewater treatment plants, owned and operated by local cities within the county. Recycled water is treated municipal wastewater treated to a level that makes it appropriate for various non-drinking water purposes (non-potable uses). The District works with these four wastewater entities on partnerships to promote water recycling for irrigation and industrial uses through agreements, collaborative projects, financial incentives and technical assistance. The existing recycled water infrastructure is shown in Figure 7-1. In FY 09/10 approximately 14,500 AF of recycled water was used in the county, thereby preserving an equal volume of drinking water supplies.

Figure 7-1 Recycled Water Systems in Santa Clara County

Recycled water comes from the collection of municipal wastewater discharged within the county, followed by treating and purifying the water to the high and strict standards set forth by the California Department of Public Health (CDPH). All recycled water used for this county is tertiary treated recycled water, which means it has undergone three stages of treatment: i.e., the primary, secondary and tertiary stages. The second stage of treatment is sufficient for landscape irrigation according to CDPH. In Santa Clara County recycled water providers go above that secondary standard, and provide a higher tertiary quality recycled water.

The four wastewater facilities located within the county are as follows:

- San José/Santa Clara Water Pollution Control Plant (SJ/SC WPCP)
- South County Regional Wastewater Authority (SCRWA)
- Sunnyvale Water Pollution Control Plant (SWPCP)
- Palo Alto Regional Water Quality Control Plant (PARWQCP)

Table 7-1 shows countywide recycled water use by facility from fiscal year 98-99 through fiscal year 09-10. Table 7-2 shows existing and projected wastewater flows and volumes. Projected wastewater flows provide an indication of the potential quantities of recycled water that may be available from each facility. The four wastewater treatment facilities located in the county and their water recycling activities are described in the sections below.

Table 7-1 Countywide Recycled Water Use (Acre-Feet)

Fiscal Year	South Bay Water Recycling Program	Sunnyvale Water Pollution Control Plant	South County Regional Wastewater Authority	Palo Alto Regional Water Quality Control Plant	Total
98-99	2,357	-	-	-	2,357
99-00	5,002	439	896	63	6,400
00-01	5,409	944	708	63	7,124
01-02	6,037	1,210	487	66	7,800
02-03	6,177	1,602	536	53	8,368
03-04	7,246	1,816	619	200	9,881
04-05	6,320	1,786	1616	610	10,332
05-06	8,582	1,994	1,671	1,420	13,667
06-07	10,100	2,078	2,035	1,451	15,664
07-08	10,386	1,157	2,311	1,471	15,325
08-09	9,697	1,643	1,902	1,420	14,662
09-10	8,652	1,330	2,037	2,458	14, 477

Table 7-2 Projected Wastewater Treatment Flows (MGD)

Wastewater Facility	2015	2020	2025	2030	2035
SJ/SC WPCP	127	134	140	147	Not Available
SCRWA	8.6	9.7	10.7	11.6	12.6
SWPCP	15	15	15	15	Not Available
PARWQCP	27	28	29	30	32

7.1.1 The San José/Santa Clara Water Pollution Control Plant (SJ/SC WPCP)

SJ/SC WPCP is a jointly owned regional wastewater treatment plant with a design flow capacity of 167 MGD. The plant treats the wastewater of over 1.5 million people that live and work in the 300-square mile area encompassing San José, Santa Clara, Milpitas, Campbell, Cupertino, Los Gatos, Saratoga, and Monte Sereno. The plant is located in Alviso, at the southernmost tip of the San Francisco Bay. Constructed in 1956, the plant had the capacity to treat 3.6 million gallons per day and only provided primary treatment. In 1964, the plant added a secondary treatment process to its system. In 1979, the plant upgraded its wastewater treatment process to a tertiary system. In 1984 the capacity was expanded to 167 MGD. Most of the final treated water from SJ/SC WPCP is discharged as fresh water through Artesian Slough and into South San Francisco Bay. About 10 percent is recycled for landscaping, agricultural irrigation, and industrial needs around the South Bay.

South Bay Water Recycling (SBWR) was created as a land discharge to reduce the environmental impact of freshwater effluent discharge into the salt marshes of the south end of San Francisco Bay, and to help protect two endangered species: the California clapper rail and the salt marsh harvest mouse. The SJ/SC WPCP is under a San Francisco Bay Regional Water Board regulatory mandate to limit average dry weather effluent flows to the bay to 120 MGD in order to prevent salt water marsh conversion, and limit the mass of copper and nickel discharged to the Bay. In 2010, approximately 9,000 AFY (about 8 MGD on average) were produced and distributed to over 600 customers in the cities of Milpitas, Santa Clara and San José.

7.1.1.1 A new relationship with the City of San José

The District has been working with the City of San José on recycled water programs since 1994, providing financial and technical support for system expansion. In early 2010, after many years of collaborative discussions and negotiations, the District Board of Directors and the San José City Council executed a 40-year long-term agreement with the City of San José on the ownership of an advanced recycled water treatment facility, operation and maintenance of recycled water facilities; decisions on export of recycled water outside the county, future expansion of SBWR that most effectively meets the needs of the community, joint technical studies on recycled water issues, and coordinated recycled water outreach. This agreement helps cement and define the relationship between the District and the City of San José. The advanced recycled water treatment facility is described in more detail below.

7.1.1.2 Advanced Recycled Water Treatment Facility

The District will begin using new treatment methods and build an entirely new facility to bring South Bay residents, businesses and agencies recycled water with less salinity. The new advanced water treatment facility will produce highly purified recycled water and strengthen the integrated management of recycled water. The facility will be owned by the District and built next to the recycled water Transmission Pump Station north of state Route 237 near the bay lands.

The first agreement executed by the District provides a 40-year lease agreement for the five-acre parcel of land needed for the facility. The second agreement integrates the recycled water programs of the City of San José and the District. The City and the District will jointly make decisions on expansions of the recycled water system, collaborate on studies and outreach, and have the ability to leverage each other's infrastructure.

The new facility will divert a portion of treated waste water from the SJ/SC WPCP and use advanced treatment methods to produce up to 8 MGD of highly purified water. This new purified water will have a near-distilled quality, which will be blended into existing recycled water flows to provide for more uses. The blended recycled water will be used to irrigate a wider variety of landscapes, like those with poorly draining soils and sensitive plant species. It is also expected to attract new industrial customers because improved water quality can reduce cooling and manufacturing costs.

While the facility will be built for non-potable uses in irrigation and industry, the same technology is being used worldwide to produce highly purified water for drinking. The new facility will use three technologies to produce near-distilled quality water: microfiltration, reverse osmosis and ultraviolet disinfection. The facility is designed to allow for future expansion.

Construction for this facility began in October 2010 and is planned to be completed by the summer of 2012. This project was awarded $8.25 million from the Federal Stimulus grant funds and approximately $3 million from a State grant, and will receive $11 million from the City of San José because it will contribute to system reliability and provide a filtration benefit and enhance recycled water quality. The City has also leased the land for this new facility to the District at a nominal cost. The location of this facility is shown in Figure 7-2.

Figure 7-2 Advanced Recycled Water Treatment Facility Site

7.1.2 Sunnyvale Water Pollution Control Plant (SWPCP)

The City of Sunnyvale's wastewater management program emphasizes three areas: (1) industrial pretreatment to lower the pollutant load prior to entering the municipal system; (2) using recycled wastewater for industrial and landscape needs to help to alleviate the fresh water shortages in this area and send less fresh water into the predominantly saltwater bay; and (3) improving the quality of the effluent.

Tertiary treatment was added to SWPCP in 1978 and the total capacity was increased to 22.5 million gallons of treated wastewater each day. The final upgrade to increase the plant to its present capacity of 29.5 MGD was completed in 1984, for the treatment of wastewater from the city of Sunnyvale.

Treated wastewater effluent from the plant is discharged through an outfall into Moffett Channel, a tributary to Guadalupe Slough and South San Francisco Bay. The plant has an average dry weather flow design capacity of 29.5 MGD, and a peak flow capacity of approximately 40 MGD.

7.1.2.1 SWPCP Water Recycling

In 1992, Sunnyvale initiated the design of facilities for the production and distribution of recycled water used mainly for irrigation purposes. In 1997 the District entered into a Joint Participation Agreement with the City of Sunnyvale for the development and utilization of non-potable recycled water. This agreement provided a financial reimbursement to Sunnyvale for recycled water produced and used that offset the need to pump potable drinking water or use District's treated water supplies. During the highest-use year experienced in 2006-7, the program delivered approximately 2,000 AF (approximately 1.7 MGD) to numerous landscape and industrial users. The District's financial incentive or reimbursement was $115 for every acre-foot of recycled water that offset the need for District potable water supplies.

The City of Sunnyvale has significantly increased the recycled water delivery from 317 AF in 2000 to 1,643 AF in 2009. The reimbursement by the District helped the City to offset the deficit between revenues and expenses and enabled the City to invest additional capital improvements to increase system reliability and expand system capacity.

Staff from the City of Sunnyvale and the District had discussions on developing a long-term comprehensive operating strategy and on near-term recycled water expansion opportunities. The near-term expansion could include improvements to the reliability of the system, and provide improved hydraulic stability by "looping" the system for greater versatility. One potential expansion project could include a recycled water connector to Sunnyvale from the South Bay Water Recycling System that will connect from a City of Santa Clara connection point to Sunnyvale's service area. Other possible future expansions could include serving recycled water to Moffett Field Golf Course and a proposed new development on the NASA Ames facility. Serving these new customers may require a collaborative effort between the District, the City of Sunnyvale, the City of Mountain View, the City of Palo Alto, and the San Francisco Public Utilities Commission.

7.1.3 South County Regional Wastewater Authority (SCRWA)

SCRWA provides wastewater treatment for the cities of Gilroy and Morgan Hill. In 1994 a new 7.5 MGD secondary wastewater treatment facility was constructed with 3 MGD of the secondary effluent undergoing tertiary treatment. The wastewater treatment plant is located approximately two miles southeast of Gilroy. The current average dry weather flow is approximately 6.5 MGD. SCRWA expanded the recycled water tertiary treatment system capacity to 9 MGD in recent years. SCRWA intends to continue expanding tertiary treatment facilities as demand for recycled water increases.

7.1.3.1 SCRWA Water Recycling

In 1977, the District, the City of Gilroy, and the Gavilan Water Conservation District (which was merged with the District in 1989) began a partnership to construct and operate a recycled water system extending from the SCRWA treatment plant to several customers along Hecker Pass Road. The system operated intermittently for about 20 years. In 1999, recycled water partnership agreements were signed designating SCRWA as the producer, the District as the wholesaler, and the cities of Gilroy and Morgan Hill as the retailers of recycled water. Currently, recycled water is only delivered in the Gilroy area.

The agreements included an upgrade of the 25-year old system to provide recycled water to golf courses, parks, and farmland along the eight-mile pipeline. In summer 2002, the District started the operation of the booster pump station at Christmas Hill Ranch Park and the 1.5 million gallon concrete reservoir above Eagle Ridge Golf Club. In spring 2003, the District also completed the rehabilitation of the 25-year-old pipelines. In FY 03/04 the system delivered 619 AF of recycled water to irrigators. In FY 09-10, the system delivered approximately 2,000 acre-feet of recycled water to irrigators.

The District and SCRWA prepared a South County Recycled Water Master Plan (included as Appendix M), which identified near-term, short-term and long-term capital improvement projects for recycled water expansion. In 2005/06, the District and SCRWA jointly implemented the near-term phase of the Master Plan recommended projects. The expansion is expected to increase recycled water delivery by an additional 800 acre-feet per year. Both agencies jointly applied for, and were awarded an implementation grant from the state of California for $2.2 million.

In 2009, one phase of the short-term project was awarded Federal stimulus grant funds. Just under $2 million of the grant will be utilized to build recycled water pipelines. Construction is scheduled for early 2011and will be completed in late 2011.

7.1.4 Palo Alto Regional Water Quality Control Plant (RWQCP)

In 1968, the cities of Mountain View and Los Altos became partners with the City of Palo Alto to construct a regional secondary treatment plant establishing Palo Alto as the operator of the plant, and requiring Palo Alto, Los Altos and Mountain View and their sub-partnering sewer agencies, East Palo Alto Sanitary District, Stanford University, and Los Altos Hills to share in the proportionate costs of upkeep. Since 1972, the plant has provided complete secondary treatment of wastewater and complete incineration of the sewage sludge. The treated water is discharged to an unnamed slough near the Palo Alto Airport and to the San Francisco Bay. In 1978 the RWQCP was upgraded to a tertiary wastewater treatment facility. In 1987, a capacity expansion project was completed to assure that the treatment plant effluent standards could be met during periods of heavy rainfall. The plant has a wastewater treatment and disposal capacity of 38 MGD.

7.1.4.1 Palo Alto RWQCP Water Recycling

In 1975, the District constructed a reclamation facility and operated it for a time before selling it to the RWQCP. In FY 04/05, Palo Alto RWQCP delivered 610 AFY of recycled water to the cities of Palo Alto and Mountain View. A recently completed recycled water pipeline from Palo Alto's RWQCP to Mountain View received significant state funding and vastly expanded recycled water deliveries. In FY 09-10, just over 2,450 AFY of recycled water was used in Palo Alto and Mountain View for non-potable uses. In addition, slightly over 1,000 acre-feet of treated wastewater was dedicated for an environmental use, wetland maintenance at a wetland by the bay. In usage numbers in previous reports, the wetland usage was counted as recycled water use. However, per Palo Alto Use of recycled water in Palo Alto is not expected to displace District supplies because the entire service area is supplied from the SFPUC system, with groundwater as back-up supply. Recycled water used in Mountain View currently can be viewed differently since approximately 15 percent of Mountain View water is supplied by the District, with the rest from San Francisco Public Utilities Commission supplies.

7.2 Recycled Water Use by Type

For FY 09-10 14,500 AF of recycled water was used throughout the county for landscape irrigation, agricultural, commercial and industrial use. Typical industrial uses include cooling tower makeup water, boiler feed water, paper manufacturing, and process water. Industrial users are high-demand, continuous-flow customers that operate without extreme seasonal and diurnal flow variations. The irrigation of agricultural crops, golf courses, parks, schoolyards, and cemeteries is a key component of recycled water use. Using recycled water for irrigation reduces the need for imported water during the critical summer months and in drought situations when water supplies are most scarce. While recycled water is currently used for large landscape irrigation, agriculture, and some industrial processes, it also has uses for environmental purposes, such as enhancing wetlands. Recycled water use will be expanded with great care to be protective of the sensitive unconfined aquifers in the county.

7.3 Water Recycling Programs

By laying the groundwork for new programs and studying recycled water uses and issues, the District has and will continue to create partnerships and systematically expand countywide water recycling. More detailed information on water recycling projects and programs is available in the Water Use Efficiency Program Annual Report FY 08/09, on the District's website and summarized in Table 7-3 below.

Table 7-3 Water Recycling Programs

Project / Program	Brief Description
Water Softener Rebate Program	This program continued the success of the Pilot Rebate Program. It encouraged Santa Clara County residents to upgrade their water softeners to conserve water, energy, and salt usage. Based on the result of the Program that was completed in January 2010, more than two and a half million gallons of water per year (enough to fill five Olympic-size swimming pools), an estimated 4,250 kilowatt hours of electricity (enough to power 75,000 60-watt light bulbs for an hour), and approximately 600,000 pounds of salt per year have been saved by replacing 1150 older-model water softeners with new technology, efficient models.
South County Recycled Water Master Plan	The District and SCRWA jointly developed a master plan for the immediate, near and long-term recycled water implementation projects in South Santa Clara County. The project started in 2003 and the Master Plan was adopted by both boards in 2004. An implementation grant of $2.2 million has been preliminarily awarded by the State Water Resources Control Board for phase 1 of the Master Plan. Immediate term projects were completed. Subsequently, 25% of the Program cost was authorized for federal funding. Near-term recycled water projects were planned and designed, for impeding construction. Federal stimulus grant funds were secured and some phases of the near-term recycled water pipelines are scheduled for construction completion in 2011.
Indirect Potable Reuse Feasibility Study	This is a Feasibility Study initiated in the latter part of 2010 with the objective of determining the technical feasibility of integrating highly purified recycled water into the water supply portfolio. It will evaluate groundwater recharge with recycled water, reservoir augmentation, direct injection, and perhaps in augmentation of advanced treated water upstream of the drinking water treatment plant. This project would determine re-operation scenarios and all alternatives to location and level of treatment and monitoring to comply with regulations.
Recycled Water Strategic Outreach Plan Development	The District is currently working with a public relations firm to develop a countywide recycled water strategic communications plan; the objective of the plan is to build community support and awareness for existing recycled water programs and applications throughout Santa Clara County and to foster community support for any potential future uses of advanced treated recycled water, including groundwater replenishment.

7.4 Encouraging Increased Use

The commitment to recycled water and encouraging its increased use is reflected in the adopted Board of Directors governance policies. District policy E-2 calls for a reliable, clean water supply for current and future generations, with Water Supply Objective 2.1.5 calling to protect, maintain, and develop recycled water. In addition the District's Chief Executive officer's interpretation of the policy and strategy E2.1.1.5 states that the use of recycled water will increase to ten percent of total water by 2020 in partnership with the community and agencies in the county.

In the past, the Board passed resolutions in support of the expanded use of recycled water and increased the District's financial incentives for the use of recycled water. These financial assistance and incentives applied to recycled water used to supplement the county's water supply and replace supplies provided by the District. The District sought to have more meaningful commitment to recycled water expansion and recently established a long-term agreement with the City of San José for recycled water. The District has also expanded its ownership of recycled water infrastructure in the South County as the recycled water wholesaler in that region. In addition, the District is building a multi-million dollar facility for the advance treatment of recycled water in the South Bay Water Recycling System, the largest recycled water system in this county.

Table 7-4 Recycled Water Projections by Facility to 2035 (AF)

	Recycling Facility	Current(1)	2015	2020	2025	2030	2035
Projections	SJ/SCWPCP	8,650	13,300	16,600	19,700	22,700	Not Available
	SCRWA	2,040	1,400	1,600	2,200	2,400	2,600
	SWPCP	1,330	1,980	2,080	2,080	2,080	Not Available
	PARWQCP (2)	2,450	2,000	2,000	2,000	2,000	2,000
	Total:	14,470	18,680	22,280	25,980	29,180	Not Available

Notes:
(1)Current use is for FY 09-10.
(2) Includes 1,000 AF of restricted use within the treatment plant for equipment cooling.

The District also participates in various recycled water research. Research areas include water quality based studies, technology-based studies on different treatment efficacies, the evaluation of the effects that existing or planned recycled water projects may have on groundwater quality, and strategies to improve quality of incoming water (source control).

On January 22, 2002, the San José City Council and the District Board of Directors held a joint meeting and approved the "Agreement between the City of San José and the District relating to Management and Operation of the South Bay Water Recycling (SBWR) system, including the Silver Creek Pipeline." The agreement required the City and the District to jointly construct a 15 MGD capacity, 10-mile pipeline that delivers recycled water to the Metcalf Energy Center (MEC), built in the north end of Coyote Valley. Five of the 15 MGD capacity was earmarked for the District and paid for by the District. The power plant is now in operation and uses approximately 2,500 AFY of recycled water, with the possibility of using up to 4,000 AFY when needed. The District may use any remaining pipeline capacity that exceeds the needs of MEC and some other users identified in the agreement for wholesale recycled water to areas south of the pipeline, including Coyote Valley.

7.4.1 Bay Area Recycled Water Coalition (BARWC)

The District participates in BARWC which is a partnership of 17 Bay Area water and wastewater agencies. This partnership is committed to maximizing the beneficial reuse of highly treated recycled water to provide a safe, reliable, and drought-proof new water supply. The product of the BARWC effort is the recent success in the 2009-2010 Federal Stimulus grant funds for a number of BARWC projects. BARWC follows on the heels of the previous comprehensive regional water recycling master plan effort by the Bay Area Regional Water Recycling Program (BARWRP). BARWRP released its master plan for recycled water in 1999. More information on BARWC can be found at the website www.BARWC.com.

7.5 Recycled Water Use Projections

The District target for recycled water use is to reach 10 percent of total countywide demand or 38,500 AF by 2020. The District's 2005 UWMP projected 16,100 AFY for calendar year 2010. Actual use for fiscal year 2009/2010 was 14,480 AF. Current and projected recycled water use provided by the recycled water producers and retailers is summarized in Table 7-3 below.

7.5.1 Projection Challenges

There are several issues and challenges associated with the increased use of recycled water that could impact the recycled water use projections presented in Table 7-4. Recycled water projects and their implementation schedules depend on cost, financing, public acceptance, water quality, regulatory actions and water supply demands. District policies that advocate aggressive protection of the groundwater basins can impact recycled water expansion projections by these recycled water producers by limiting where or how much recycled water can be expanded. Some of these issues are discussed below.

7.5.2 Implementation Costs & Financing

Recycled water systems are separate from the potable system, so projects require significant capital investments in treatment and distribution and the uncertainty of market demands creates a risk to cost recovery. This large capital risk may deter individual agencies from undertaking recycled water projects. The District has attempted to overcome this on two recycled water projects done in collaboration with the City of San José and with the City of Gilroy. The District also was successful in leveraging significant federal and state grants for these recycled water infrastructure projects.

7.5.3 Public Acceptance

Educating and informing the public about recycled water will be key to recycled water expansion in the future. Numerous public opinion studies within the county as well as elsewhere have shown that when the public was provided with informative materials regarding recycled water—its uses, treatment technology, benefits, the public's previous skepticism and/or concern lessens. As such, the District has contracted with a public relations firm to develop a recycled water strategic communications plan for recycled water that will cover the next five years. Components of this plan include the following elements:

- refinement of key messages/terminology
- development of outreach materials, including a website, printed materials, educational DVDs/videos, posters, and public service announcements
- creation of a speaker's bureau
- construction of a rapid response plan
- development of a media outreach strategy

7.5.4 Water Quality

Water quality is a critical issue when evaluating recycled water and the District is exploring the feasibility of using advanced treated recycled water in the future to make recycled water suitable for new markets. The District requires recycled water to be of appropriate quality to not pose a contamination threat to any sensitive underlying aquifer. In addition, the District continually monitors groundwater quality and is expanding its monitoring network to target areas where recycled water is used for irrigation. The monitoring data will be used to detect and correct potential problems early on, before they have a chance to develop. In the long term, it will be important to track research and regulations related to the use of recycled water. Some constituents of concern are endocrine disrupting compounds (EDCs) and N-nitroso dimethly amine (NDMA). Other constituents of concern such as pharmaceuticals and personal care products (PPCPs) are sometimes detected, but there is very little scientific knowledge of the fate and transport of these constituents or their impact. No current regulations are in effect regarding EDCs in recycled water. Ultraviolet radiation (e.g., from sunlight) is known to destroy NDMA. Therefore, given the current recycled water irrigation practices in Santa Clara County, NDMA likely poses no significant threat to groundwater quality since it will be degraded by sunlight when it is sprayed.

7.5.5 Indirect Potable Reuse

The District is also investigating the feasibility of indirect potable reuse through the study of how highly purified recycled water can be used to recharge groundwater basins by surface spreading or groundwater injection, or by surface reservoir augmentation.

Determining the technical, economic, and political feasibility of an indirect potable reuse project requires a comparison of alternative water supply options, costs, public acceptance for such a project, and political will. This comparison involves a detailed analysis of the costs and benefits of each alternative, and their public acceptance.

One potential challenge with the use of recycled water for indirect potable reuse is the potential for adverse public opinion. Potential for groundwater quality impacts from organic contaminants, metals, and salts can be addressed by the ultra-pure treatment technologies, and the ultra-violet disinfection steps, and perhaps advanced oxidation for further treatment. The groundwater monitoring requirements would be conducive in providing an early warning system, plus they will be in alignment with the concept of a multi-barrier approach to water supply safety. Groundwater recharge projects require review by the California Department of Public Health. Orange County Water District's Groundwater Replenishment Project's successful effort for a significant period of time has provided a sound basis for similar consideration in Santa Clara County.

8 2010 URBAN WATER MANAGEMENT PLAN

Chapter 8.0 | Water Quality

This chapter provides general information related to water quality. Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist item 52.

Ensuring water quality is critical to overall water supply reliability and the District works diligently to protect surface water and groundwater resources in the county, as well as its imported supplies that are conveyed through the Delta. A detailed discussion of groundwater and surface water quality is presented in the sections below. Applicable Board policies include E-2.1.1, "aggressively protect groundwater basins from the threat of contamination", and E-2.3.2, "meet or exceed all applicable water quality regulatory standards at a reasonable cost."

8.1 Groundwater Quality

Groundwater quality protection programs include well construction/destruction standards and inspections, coordination with land use and regulatory agencies, technical studies, and community outreach.

8.1.1 Groundwater Quality, Monitoring and Protection

No single risk factor can substantially impact the water quality of the entire groundwater resource in Santa Clara County. However, there are factors that can impact the water supply within a portion of a groundwater subbasin. Leaking underground fuel tanks, industrial spills, storm runoff, inefficient agricultural operations, septic systems, and other sources can pollute groundwater, requiring costly treatment or even making the groundwater unusable.

The majority of public water systems in the county have multiple sources and the water delivered to the customers is usually a blend of these sources. The water supply system can be operated in a way so as to not exceed Maximum Contaminant Levels (MCL) and maintain long term reliability. Private well owners are encouraged to have the water in their wells tested frequently to be aware of the quality of their drinking water.

Overall groundwater quality in Santa Clara County is very good and water quality objectives are achieved in most wells. Public water supply wells throughout the county deliver high quality water to consumers, almost always without the need for treatment. The most significant exceptions are nitrate and perchlorate, which have impacted groundwater quality predominantly in South County. In the future, new and more stringent drinking water quality standards could also affect the amount of groundwater pumped from the basin.

The District monitors groundwater quality to assess current conditions and identify trends or areas of special concern. Wells are monitored for major ions, such as calcium and sodium, nutrients such as nitrate, and trace elements such as iron. Wells are also monitored for man-made contaminants, such as organic solvents. The type and frequency of monitoring depends on the well location, historic and current land use, and the availability of groundwater data in the area.

Almost 800 solvents and toxics subsurface contamination sites and approximately 2,500 fuel leak sites have released contaminants to soil and/or groundwater. The vast majority of these sites have affected the shallow aquifer above the aquitard zone and the contaminants have not migrated to the deeper principal water supply aquifers. Although many of these sites have been closed by the regulatory agencies and the threat to groundwater and public health has been minimized, over 450 solvent cases and 300 underground storage tank cases remain open. While a threat to the county's water supply still exists, it has been reduced through better material and waste management practices such as reducing the number and size of releases to the environment, aggressive clean-up of past releases by the responsible parties, and active oversight of site clean-up activities by local, state, and federal regulatory agencies. Although these sites may pose a threat to individual water supply wells, the number and distribution of water supply wells located throughout the county and the variety of sources in the water supply portfolio limit the impacts to the county's water supply reliability.

The District is not the only organization that conducts groundwater quality monitoring in Santa Clara County. Public water suppliers monitor their wells regularly to ensure the water meets applicable water quality standards. In addition, responsible parties and property owners conduct groundwater monitoring at contamination sites to evaluate the extent and severity of contamination and to monitor the effectiveness of their cleanup efforts. Potential threats to groundwater quality are discussed below in greater detail.

8.1.1.1 Nitrate

Nitrate in the environment comes from both natural and anthropogenic sources. Small amounts of nitrate in groundwater (less than 10 mg/L) are normal but higher concentrations suggest an anthropogenic origin. Common anthropogenic sources of nitrate in groundwater are fertilizers, septic systems, and animal waste. The drinking water MCL for nitrate is 45 mg/L. Because the Santa Clara Valley has a long history of agricultural production and septic systems are still in use in the unincorporated areas of the county, nitrate is an ongoing groundwater protection challenge in this valley.

Based on the District's 2009 Groundwater Quality Report (March 2010), the median 2009 nitrate concentration in the principal aquifer of the Santa Clara Plain and Coyote Valley is 21 mg/L and 22 mg/L, respectively. Due to the more rural nature and presence of ongoing sources, elevated nitrate is more common in South County. The 2009 maximum nitrate concentration in Coyote Valley is 62 mg/L, as opposed to 31 mg/L in the principal zone of the Santa Clara Plain. The 2009 median nitrate concentration for the principal aquifer zone of the Llagas Subbasin is 30 mg/L, with a maximum value of 155 mg/L.

Public water supply wells with nitrate above drinking water standards must blend or treat the water prior to delivery to customers. As elevated nitrate is an ongoing groundwater protection challenge, the District has undertaken numerous efforts since 1992 to define the extent and severity of nitrate, identify potential sources, reduce nitrate loading, and reduce customer exposure. Current efforts focus on the evaluation of nitrate data to assess hot spots and trends, public outreach, and collaboration with other agencies such as the Santa Clara County Farm Bureau to increase water and nutrient use efficiencies. Additional nitrate management strategies will also be evaluated as part of the regional salt and nutrient management plans, which will be developed in coordination with other basin stakeholders.

8.1.1.2 Perchlorate

Perchlorate is an oxidizing salt used in solid rocket motors, safety flares, explosives and fireworks. A former highway safety flare production plant operated for 40 years by Olin Corporation in Morgan Hill, South Santa Clara County, caused a ten-mile long plume of perchlorate in groundwater. Perchlorate was found above California's maximum contaminant level of 6 parts per billion (ppb) in over 150 private and public wells in 2004, including several municipal wells in Morgan Hill and several mutual water company wells. The California Regional Water Quality Control Board, Central Coast Region, has issued a Cleanup and Abatement Order to Olin, and has ordered Olin to provide an alternate water supply to those with wells showing perchlorate above the MCL.

Since 2005, perchlorate concentrations have declined due to perchlorate source removal, ongoing artificial recharge by the District, and natural recharge from rainfall and stream flows. The size of the perchlorate plume has decreased and perchlorate concentrations have decreased throughout the area. As of November 2010, only eight domestic wells had perchlorate above 6 ppb.

Another perchlorate site in Santa Clara County is a major rocket motor production facility outside the groundwater basin but upstream of the District's Anderson Reservoir. That site is also under a Cleanup and Abatement Order and the cleanup is being managed on-site; no perchlorate has been detected in Anderson Reservoir. The District is continuing to work with the Regional Water Quality Control Boards to ensure that perchlorate does not further impact the current or future water supply in Santa Clara County.

8.1.1.3 More Stringent Regulatory Standards and Emerging Contaminants

In the future, new understanding of the risks of constituents in drinking water could result in more stringent drinking water standards and more constraints on the use of groundwater. For example, currently there is no drinking water standard for hexavalent chromium (chromium-VI). While chromium-III is an essential nutrient for the body, chromium-IV is being evaluated by federal and state regulatory agencies as a suspected carcinogen in water. In 2010, the California Department of Public Health (CDPH) established a draft Public Health Goal (PHG) of 0.02 ppb for hexavalent chromium. While a PHG is not an enforceable regulatory standard, it marks the beginning of the process to develop the drinking water standard. While chromium-IV has been detected in wells throughout Santa Clara County, it is unclear what this represents for drinking water consumers until further state or federal regulatory guidance is provided.

Emerging contaminants also have the potential to constrain the use of groundwater and other water supply sources. Emerging contaminants of concern include pharmaceuticals and personal care products, industrial chemicals, and endocrine disrupting compounds.

8.2 Surface Water Quality

Treatment of surface water is necessary to ensure that the water the District provides meets or exceeds all federal and state drinking water standards. Surface water quality programs include treating local and imported surface water for sale to retailers; participating in regional and statewide coalitions to safeguard source water quality protection and investigating opportunities for water quality improvements through partnership in regional facilities or exchanges.

Rinconada WaterTreatment Plant Clarifier

8.2.1 Source Water Assessment and Protection

The District continues to identify potential management practices that could improve source water quality and reduce the impact of potential contaminant sources. The District completes a Watershed Sanitary Survey every five years, as required by CDPH that examines possible sources of drinking water contamination and recommends how to protect water quality at the source.

The District's source waters are susceptible to potential contamination from sea water intrusion and organic matter in the Delta and from a variety of land use practices, such as agricultural and urban runoff, recreational activities, livestock grazing, and residential and industrial development. Local sources are also vulnerable to potential contamination from commercial stables and historic mining practices. No contaminant associated with any of these activities has been detected in the District's treated water. The water treatment plants provide multiple barriers for physical removal and disinfection of contaminants. The District's Water Quality Unit monitors surface water quality in District reservoirs and in the Sacramento-San Joaquin Delta.

CDPH developed the Drinking Water Source Assessment and Protection (DWSAP) Program to evaluate the vulnerability of water sources to contamination and to prioritize activities for protective measures. Assessments of the drinking water sources for the District were completed in 2002. The South Bay Aqueduct DWSAP report was completed by Archibald & Wallberg Consultants, under contract to the District, Alameda County Water District, and Zone 7 Water Agency. The San Luis, Anderson and Calero reservoirs' DWSAP reports were prepared by the District based on a detailed sanitary survey of the watersheds and the District's Comprehensive Reservoir Watershed Management Plan.

Each report presents the possible contaminating activities within the source drainage area ranked as being of high, medium, or low significance based on the potential of the activity to contribute to water quality challenges at the water treatment plants. The reports also present existing management and protection activities. The steps involved in a source water assessment include the following:

- Delineation - The area that contributes water to the well or surface water intake is determined, and source water protection zones are defined.
- Inventory - An inventory of the types of Possible Contaminating Activities (PCAs) within the source protection zones that may affect the water supply is conducted.
- Vulnerability Analysis - A susceptibility analysis of the located potential sources of contamination is conducted. This will alert the public water system to the contaminant sources that have the greatest likelihood of affecting the water supply.

Assessment reports are developed that summarize all the information gained during the assessment. The reports include maps of the source water area, lists of potential sources of contamination, and summaries of the susceptibility analyses. This information is provided to public water systems and made available to the public.

8.2.2 Treated Water Quality

Water quality standards for delivered treated water are met through aggressive source water protection, ongoing improvements to treatment facilities, and re-operations for blending. Water utilities face new challenges when new contaminants are identified as a result of laboratory analysis or when new and lower thresholds for health effects and regulatory compliance are established for existing contaminants. Santa Clara County has experienced both circumstances in recent years. As a voluntary member of the Partnership for Safe Water, a program of the U.S. Environmental Protection Agency, the District is committed to scrutinize its current water treatment practices, make improvements where necessary, have its water operations examined by independent experts, and report the findings to its customers. The Partnership for Safe Water is a unique cooperative effort between the EPA, American Water Works Association, Association of Metropolitan Water Agencies, National Association of Water Companies, and Association of State Drinking Water Administrators. The Partnership encourages and assists United States water suppliers to voluntarily enhance their water systems performance, for greater control of cryptosporidium, Giardia and other microbial and inorganic contaminants.

In addition, the District tests the water produced at the three water treatment plants for chromium-IV. To date, the District has not detected chromium-IV in treated water at the state certified reporting limit of 1 ppb. This is the lowest level of detection that is currently available for a state certified laboratory. In January 2011, the District laboratory began preliminary work to achieve a lower reporting limit. In developing an advanced testing method, we conducted a round of sampling at our three treatment plants and found chromium-IV in the 0.06 to 0.09 ppb range. This lower reporting level is not yet approved and staff will be working with the California Department of Public Health to determine the next steps in obtaining certification.

8.2.3 Water Treatment Improvement Project (WTIP)

The District is in the middle of major renovations at each of the District's three water treatment plants. The first phase of WTIP is complete and phase 2 (WTIP2) will be completed by 2013. The project is the District's response to the federal Safe Drinking Water Act and the EPA's call for more stringent water quality regulations. Specifically, the first phase of the project provides changes to assist compliance with the first stage of the EPA's new Disinfectant/Disinfection Byproducts Rule and Interim Enhanced Surface Water Treatment Rule, while maintaining a safe and reliable system and aesthetically pleasing water. With the addition of ozonation the District will reduce trihalomethanes (THMs), a byproduct of chlorination. During the warmest times of the year when algae can cause unpleasant tastes and odors, ozonation will also enhance the flavor of the finished water.

Water diverted from the Sacramento-San Joaquin Delta contains relatively high concentrations of salts (bromide) and organic compounds. These constituents are precursors to the formation of disinfection byproducts, a major concern for the District. Delta water will only be able to meet current and anticipated drinking water standards through advanced treatment technologies and source water quality improvements.

8.2.4 Reservoir Operations

Advantages of local reservoir storage include the ability to operate for water quality benefits. For example, one way to address occasional increases in bromide concentration in imported water is to blend the source water for the water treatment plants with other source waters, such as local surface water or groundwater. Given the right opportunity, existing local water storage can also be operated for water quality benefits by releasing water when its quality is better than imported water during dry years or dry seasons, when imported water quality is poorer.

Calero Reservoir

9 2010 URBAN WATER MANAGEMENT PLAN

Chapter 9.0 | Addressing Threats to Supply Reliability

This chapter provides general information related to potential threats to water supply reliability and describes District efforts to address these threats, uncertainties, and risk. Information in this chapter is intended to satisfy the requirements related to DWR UWMP Checklist item 23.

Water supply reliability includes the availability of the water itself as well as the reliability and integrity of the infrastructure and systems that transport, treat, and store it. As the principal water manager for Santa Clara County, the District strives to meet water demands under all hydrologic conditions, including satisfying its treated water contract obligations for deliveries to the water retailers. The District also works to ensure supply reliability by managing the groundwater basins and maximizing its influence over sources of water supply and operations.

Managing the District's water supply portfolio to provide a reliable source of water requires complex analyses that incorporate the multiple sources of water of varying hydrology and availability, with available facilities to meet a range of uses, while accommodating regulatory constraints and institutional issues. Polices that pertain to addressing threats to water supply reliability are captured in Board Policy No. E-2. Specifically, the Board's water supply policies are as follows:

2.1 Current and future water supply for municipalities, industries, agriculture and the environment is reliable

2.2 Raw water transmission and distribution assets are managed to ensure efficiency and reliability

2.3 Reliable high quality drinking water is delivered.

9.1 Threats to Supply Reliability and Threat Management

Several factors including hydrologic variability, climate change, invasive species, infrastructure failure, regulatory actions as well as institutional, political and other uncertainties have the potential to negatively impact reliability. The following sections describe these threats and the activities of the District to address them.

9.1.1 Hydrologic Uncertainties and Climate Change

Hydrologic uncertainties influence the projections of both local and imported water supplies and the anticipated reliability of those supplies. The analysis performed and summarized in this report is based on the assumption of historical patterns of precipitation. If the historical sequence is not representative of future hydrologic conditions then the quantities of supplies summarized in Chapter 10 would not accurately represent future conditions. The development of District projects and programs to meet future needs takes hydrologic variability and climate change into account.

Increases in average ambient temperature due to climate change are generally agreed upon by the scientific community and the impacts of increasing temperature have already been observed. Climate change effects on precipitation are more difficult to predict, with some models forecasting less rainfall for the state and some models forecasting more rainfall. Regardless of the impacts on the total amount of precipitation, rises in average temperature will increase sea level and decrease the snow pack—by far the largest surface water "storage" facility in California. Decreased snow pack and projected earlier spring melts will reduce the amount of water available to meet peak demands in late spring and summer. These changes could decrease imported water and possibly local water supplies, while increasing salinity in the Delta, adversely impacting water quality and Bay-Delta ecosystems.

Based on the State Water Project Delivery Reliability Report 2009 and associated CALSIM II modeling results, projected imported supplies under climate change conditions from the Delta for average, normal year, dry year and multiple dry years are shown in Table 9-1. As shown in the table, Delta imports are reduced by 3 percent on average and 4 percent over the multiple dry year period compared to the analysis performed without climate change.

The deliveries identified in the above table from the Delta are under future 2029 conditions using the MPI-ECHAM5 model with A2 emissions. MPI ECHAM5 refers to a recent version of ECHAM which is the Global Climate Model developed by the Max Planck Institute (MPI) for Meteorology. A2 emission scenario assumes high growth in population, regional based economic growth, and slow technological changes, which result in significantly higher greenhouse gas emissions. The CalSim II model for the climate change scenario was run assuming a 2050 level of emissions and then interpolated back to 2029. As discussed in section 10.1.1.3, these values have been incorporated into the supply reliability modeling analysis.

Under any climate change scenario, the District may need to consider additional treatment options to respond to water quality impacts associated with increased salinity in the Delta. The District may also need to consider additional storage to take advantage of more wet-season water, additional supplies to replace reduced water supply from existing sources, and additional water transfers (depending on water market impacts).

The District's work on climate change action planning supports the District's greenhouse gas emission reduction and climate change adaptation strategies. Greenhouse gas emission reduction efforts are documented in accordance with the District's Quality and Environmental Management System. Under this system, continuous improvement policies and processes are evaluated and refined to ensure that adaptation strategies are integrated into our operations and capital projects. This program supports the development of additional strategies to reduce greenhouse gas emissions and to adapt to changing local and regional weather and precipitation patterns that may present water supply and ecosystem stewardship risks.

Table 9-1 Comparison of District Imports from the Delta with and without Climate Change (AFY)

Delta Imports 2029 Study					
Year Type	**Year**	**No Climate Change**	**With Climate Change**	**Difference**	**Percent Change**
Average	-	175,100	169,900	-5,200	-3.0%
Normal Year	2002	177,100	172,100	-5,000	-2.8%
Dry Year	1977	78,200	80,200	2,000	2.6%
Multiple Dry	1987	134,500	124,600	-9,900	-7.4%
	1988	87,000	95,000	8,000	9.2%
	1989	170,800	157,300	-13,500	-7.9%
	1990	84,000	87,000	3,000	3.6%
	1991	108,600	103,000	-5,600	-5.2%
	1992	126,600	105,700	-20,900	-16.5%
Multiple Dry Average		118,600	112,100	-6,500	-4.0%

Notes:
(1) Total imports based on DWR "State Water Project Delivery Reliability Report 2009" and associated CALSIM II modeling results.
(2) Deliveries from the Delta under future 2029 conditions MPI-ECHAM5 Model with A2 Emissions. See State Water Project Delivery Reliability Report 2009 for more information.
(3) Includes the 1997 Water Reallocation Agreement discussed in Section 3.4.2.

9.1.2 Local Supply Reliability

9.1.2.1 Reservoirs

District facilities are subject to regulations regarding seismic performance of dams, reservoir landslide monitoring and evaluation, and periodic field inspections. Department of Safety of Dams (DSOD) interim operating restrictions placed on Anderson, Coyote, Almaden, Calero and Guadalupe reservoirs have resulted in loss of storage capacity and water supply yield. As part of the Dam Safety Seismic Stability capital project, the follow evaluations were performed: a seismic stability evaluation for Anderson dam, field and lab investigations and agreement on engineering material properties for the Almaden, Calero and Guadalupe dams, and field and lab investigations for Stevens Creek and Lenihan dams.

Re-operation of reservoirs and interconnecting infrastructure has and continues to be evaluated by the District as a means to stretch existing supplies and maximize their efficient use. For example, re-operations could involve the construction of a raw water pipeline from Lexington Reservoir to the Vasona pumping plant, allowing the District to store imported water to serve as a backup for Rinconada Water Treatment Plant. Also included in the re-operations are District-owned well fields, providing the District groundwater pumping capability to back up treated water systems. The integration of District groundwater pumping and surface water supplies could help to optimize management of local supplies and provide emergency back-up supply.

9.1.2.2 Fisheries and Aquatic Habitat Collaborative Effort

In May 2003, the District entered into the draft Fish and Aquatic Habitat Collaborative Effort Settlement (FAHCE) Agreement with state and federal resource agencies to resolve a water rights complaint regarding the effect of its water supply operations on cold water fisheries in Guadalupe River, Coyote Creek, and Stevens Creek. This project supports activities needed to resolve the water rights complaint with the State Water Resources Control Board.

The draft Settlement Agreement balances water supply and fisheries needs. When implemented, the plan will improve local fisheries while serving as the basis for dismissal of the water rights challenge and provide the District with assurances that its water rights are protected from future challenges. The terms of the settlement will require managing water supply operations to tight standards designed to protect fisheries resources while meeting water supply management objectives. To ensure success, the District will implement a range of actions that include habitat restoration, fish passage, and capital improvement projects consistent with its watershed stewardship program.

Before returning to the State Water Resources Control Board to resolve the water rights complaint, the District must prepare a Habitat Conservation Plan (HCP) to provide incidental take coverage for all the activities included in the draft Settlement Agreement. To provide a comprehensive conservation program, a full range of water supply activities in the three watersheds will be included in the Three Creek's HCP. The District has also added the dam safety program and recharge operations to the list of covered activities. The District has been actively involved in developing the Three Creeks HCP since 2005 and will release a public review draft for comment. An Environmental Impact Report (EIR) on the Three Creeks HCP must be prepared before the District or other agencies can approve the Three Creeks HCP.

9.1.2.3 Invasive Species

To date, no quagga or zebra mussels have been documented in the District's facilities or infrastructure. However, the introduction and spread of mussels to California has increased the likelihood of mussel infestation and impacts to the District in the future. Mussels are easily spread to surface water bodies by recreational boats, trailers, boating equipment, and baits. Mussels can also be spread by water transfers via water diversions, canals, aqueducts, and raw water distribution systems.

Zebra Mussels

Dreissenids, which are a family of small freshwater mussels, are able to densely colonize almost any hard-substrate in an infested water body. This includes infrastructure such as racks, intakes, screens, pipes, pumps, dam faces, outlets, gates, valves, etc. They can quickly reach densities that may completely cover trash racks and screens, clog pipes and pumps, plug lines and monitoring equipment, and restrict flow meters, valves and gates. Even though larger diameter pipes may not become completely plugged, increasing roughness caused by attached mussels can affect flow rates and pump efficiencies. Additionally, shell debris from dead mussels may enter pipelines and can clog screens and pipelines.

Any submerged structure in (or pipe containing) raw water with flow rates at or below 6 feet per second are susceptible to colonization by mussels. Detailed vulnerability assessments for District water treatment plants, pumping plants, and the Anderson Hydroelectric Facility, have been completed. Structures and processes that would be affected by a mussel infestation may include the following:

- Intake structures and screens
- Tanks
- Drains and sumps
- Valves
- Pumps
- Strainers
- Pipes
- Grates
- Outlets
- Trash Racks
- Raw water sample lines to the laboratory
- Water quality stations
- Dewatering systems
- Cooling water for pumps, equipment, etc.
- Service water
- Fire protection

9.1.3 Local Infrastructure Reliability

Maintaining the integrity of the District's existing infrastructure is essential to ensuring the reliability of the District's water supply. This includes maintaining the existing capacity of recharge facilities and ensuring that other facilities, such as reservoirs, treatment plants, and conveyance and distribution infrastructure are safeguarded.

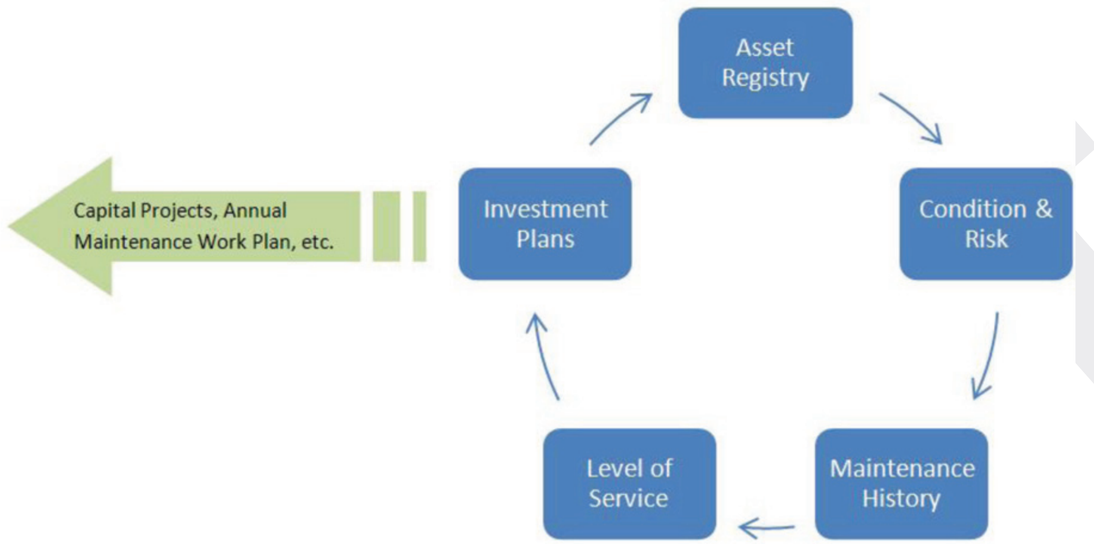
In 2003, the District initiated the Water Utility Infrastructure Reliability Project (IRP) to determine the current reliability of its water supply infrastructure (pipes, pump stations, treatment plants) and to appropriately balance level of service with cost. The project measured the baseline performance of critical District facilities in emergency events and identified system vulnerabilities. The study concluded that the District's water supply system could suffer up to a 60-day outage if a major event, such as a 7.9 magnitude earthquake on the San Andreas Fault, were to occur. Less severe hazards, such as other earthquakes, flooding and regional power outages had less of an impact on the District, with outage times ranging from one to 45 days. See Chapter 6 for further information related to catastrophic supply interruption planning and the IRP.

9.1.3.1 Water Utility Asset Management Program

Since the initial development phase of the Water Utility Asset Management Program which began in January 2002 and was completed in July 2004, a process of continual improvement has taken place by adding functionality and content to the program. The overarching goals of the program remain the same: namely to ensure continued, reliable services, at the level our customers require, at the lowest possible cost.

The current state of practice includes a formal and ongoing condition assessment program incorporating the use of hand held computers for asset condition data collection in the field, a comprehensive risk and condition data base (CARA), and a long term funding model called the Infrastructure Capital Asset Management Toolkit (ICAM) all of which are contained on a dedicated server on the District's intranet. The information contained in these asset centric information technology tools is being used in concert with the information contained in our Computerized Maintenance Management Tool (Maximo) to support and inform infrastructure investment decisions. Based on the information contained in these tools, over the past five years the District has developed and implemented, fiscal year specific Annual Maintenance Work Plans (AMWP) as a mechanism to support the budget development process for infrastructure investment and to serve as a tracking tool for investments. A basic representation of the process used in developing investment needs is shown in Figure 9-1.

Figure 9-1 Investment Needs Process



Using the AMWP as a tool, the District has been able to successfully identify, plan, fund, and execute significant infrastructure investments. Some examples of work accomplished since the inception of the AMWP are as follows:

- Performed pipeline rehabilitation and inspection on more than 72 miles of Raw and Treated Water pipelines which represents about 51 percent of our pipeline infrastructure.
- Recoated the Pacheco Regulating Tank and initiated a seismic upgrade of the tank.
- Completed the rebuild of eleven of the twelve 2000 horse power pumps at Pacheco Pumping Plant.
- Initiated the replacement of 12 obsolete adjustable speed drives for the pumps at Pacheco Pumping Plant.
- Rebuilt all six 2000 horse power pumps at Coyote Pumping Plant.

9.1.3.2 Backup Treated Water Delivery

In order to enhance reliability in case of transmission system disruptions of shut downs, the District can transfer up to 40 MGD of treated water to or from the San Francisco Public Utilities Commission (SFPUC) through an intertie located in Milpitas during planned or unplanned system outages. The District does not own these facilities, but has a five-year agreement with SFPUC to perform maintenance and operations and costs are born by the organization receiving the water.

The District does not currently operate groundwater wells and is not able to directly substitute groundwater for surface water due to a lack of District-owned water supply wells and related infrastructure. However, the District is currently pursuing well fields that will tie directly to the treated water distribution system for increased operational flexibility and system reliability. A pilot facility, the San Tomas Well Field, is currently being developed in Campbell.

Existing water supply wells owned and operated by retailers will be able to provide emergency backup to treated water supplies when sufficient groundwater is available. The District will continue to explore opportunities to re-operate the water supply system to improve the integration of surface water and groundwater resources. The District intends to work with local retailers to ensure that backup groundwater supplies are ready and available from retailers' wells when needed to supplement treated surface water supplies.

9.1.4 Imported Water Supply Reliability

The District imports water through the Sacramento-San Joaquin Delta (Delta) under contracts with the SWP and the federal CVP. The District's baseline imported water supplies, outside-county water banking, and water transfer agreements all rely on conveyance of water through the Delta.

9.1.4.1 Imported Water Supplies Infrastructure

An earthquake that affects the Sacramento-San Joaquin Delta could reduce the District's ability to take its imported water supplies from both the CVP and SWP, either from failure of the District's conveyance system, failure of State or federal conveyance infrastructure, or saltwater intrusion due to Delta island levee failure. In addition to disrupting contract supply deliveries, outages to the conveyance system would also impact the District's ability to put water into or take water from the Semitropic Water Bank, or to take delivery of water transfers from north-of-Delta sources.

The Delta has more than 1,000 miles of levees that are vital to flood protection for islands that are, in some cases, more than 20 feet below sea level. Many of the levees are also vital for protecting the quality of SWP and CVP water conveyed through the Delta. Yet many of these levees were constructed in the early 1900's without proper engineering and the integrity of the Delta levee system has declined to a dangerous level. According to reports from the Public Policy Institute of California there is a 2-in-3 chance of a massive levee collapse in the Delta in the next 50 years. An earthquake that causes the flooding of one or more Delta islands could result in saltwater intrusion that seriously degrades imported water quality. In June 2004, a levee in the Jones Tract failed, resulting in total inundation of the island and impacts to SWP and CVP water quality for several months.

As infrastructure ages, both the SWP and CVP systems become increasingly vulnerable to natural disasters. The SWP's South Bay Aqueduct overlies the Hayward Fault, and the CVP's Santa Clara Conduit overlies the Calaveras Fault. San Luis Reservoir, the major CVP/SWP storage facility south of the Delta, is undergoing analysis for a major seismic safety retrofit. It is unknown whether the reservoir will be subject to interim operating restrictions. DWR has undertaken a South Bay Aqueduct Improvement and Enlargement Project to increase the reliable capacity to 430 cfs to serve expanded areas in Zone 7, Alameda County, and to restore 270 cfs design capacity to Santa Clara County. Construction is scheduled to be completed in 2011.

9.1.4.2 Imported Water Supply Regulations

The Delta is the largest estuary on the west coast and supports more than 750 species of plants and wildlife. The Delta also provides water supply to more than two-thirds of the population in the state and to agriculture in the Central Valley and the San Felipe Division. However, decades of competing demands have taken a toll on the Delta and today it no longer functions as a healthy ecosystem or as a reliable source of water.

In the last 15 years, major changes have been made in operating the SWP and CVP as a result of State Water Resources Control Board regulations to protect Delta water quality, and as a result of required actions under the Endangered Species Act to protect and restore endangered and threatened fisheries species. These regulations have required substantial increases in Sacramento Valley stream flows and Delta outflow, as well as reduced Delta exports at certain times of the year. More than $1 billion in environmental restoration was invested during the 1990's through the CALFED Bay-Delta Program, and under the authority of the 1992 Central Valley Project Improvement Act. As a contractor of both the SWP and the CVP, the District contributes both water and restoration funds to safeguarding the Delta ecosystem.

The listings of the winter run Chinook salmon and the delta smelt under the Endangered Species Act (ESA) have had significant impacts on SWP and CVP pumping from the Delta. Pumping capabilities are restricted in months when resident fish populations are most vulnerable or migrating fish may be adversely impacted. The "take" of listed endangered species is regulated under the ESA. The operation of export pumps in the Delta may result in the incidental take of fish such as the delta smelt, a listed species. When take limits are exceeded, the export pumping is reduced or halted to protect endangered fisheries, potentially reducing export deliveries. For example, in the summer of 1999 the U.S. Fish and Wildlife Service ordered a reduction in pumping in the Delta to protect a threatened fish, the delta smelt.

The District's imported water interests are protected and promoted through participation in contractor groups, including the State Water Contractors, the San Luis and Delta-Mendota Water Authority, and the State and Federal Contractors Water Authority. The District plays an active role in resolving Bay-Delta issues, improving source water quality, and strengthening agreements among state and federal agencies and various water users to increase overall reliability of supply. The District is actively participating in the Bay Delta Conservation Plan, the Delta Habitat Conservation and Conveyance Program, and other related processes. In addition, the District's Imported Water Unit acts as a liaison with the DWR and USBR on imported water contract issues, operations, and financial management.

To stay abreast of institutional and political changes, the District coordinates with other agencies and coalitions and advocates for District water supply and quality interests in regulatory and political arenas. The District's Government Relations Unit coordinates timely communication and advocacy of the community's water-related interests with the U.S. Congress, state Legislature, state and federal regulatory agencies, and local governments.

9.1.4.3 San Francisco Public Utilities Commission (SFPUC) Supplies

SFPUC supplies constitute about 15 percent of the overall water supply in Santa Clara County and contribute to the diversity of water supply sources. If the quantity of SFPUC supplies and use in the county were to diminish in the future, the District would likely need to make up the lost supply through additional investments in new supply options or demand management. This potential reduction of SFPUC supplies could result from retailers' shift in use due to the price differential between SFPUC supplies and the District's groundwater production charge, or from SFPUC supply interruption to the cities of San Jose and Santa Clara because of the temporary and interruptible nature of the two contracts.

9.1.5 Groundwater Production Charges

For the decades ahead, the highest priority work of the District's Water Utility Enterprise is to implement a program of activities to ensure that water supplies are diversified and reliable to meet current and future demands and that treated water quality standards are met. This program of operations, maintenance, and capital improvement activities will require continued funding from groundwater production charges and other sources of revenue.

If revenue from the groundwater production charges is reduced or eliminated, then all of the groundwater and conjunctive use management programs would need to be drastically reduced or eliminated. If this scenario were to occur, groundwater levels would drop drastically due to lack of artificial recharge to rectify continued groundwater production. In the North County, a sustained drop in groundwater levels could result in the re-initiation of land subsidence and the resultant damage to infrastructure. In South County, where groundwater is the primary source of supply, a precipitous drop in groundwater levels could result in groundwater wells running dry. Overall, water supply would be insufficient to meet current and future demand. The economic, social, and environmental vitality of Santa Clara County cannot be sustained under such a scenario.

9.2 Addressing Risk and Uncertainties

To meet future needs efficiently requires looking at different futures (or scenarios), each corresponding to a different combination of risk factors, and identifying what actions are required to meet each possible future should it arise.

Risks such as climate change, changes in water quality standards, issues in the Delta, demand growth greater than projected, and failure to fully implement conservation programs all have the potential to impact District supplies in the long term, although the degree of impact is unknown at this time. These risks will be further evaluated in the District's Water Supply and Infrastructure Master Plan (Water Master Plan). The District will continue to monitor risks that can change the water supply outlook and will work to influence key external decisions that have the potential to impact baseline and future water supplies.

10 2010 URBAN WATER MANAGEMENT PLAN

Chapter 10 | Water Supply Reliability
(Supply and Demand Comparison)

This chapter summarizes total supplies available in Santa Clara County over the historical hydrologic sequence with current existing facilities and institutional arrangements and compares these total supplies to total county demands. Supplies and demands are evaluated on a countywide basis and localized issues such as conveyance limitation and potential local groundwater pumping issues are not addressed in this plan. Information in this chapter supports Board Policy 2.1 which states the following: "current and future water supply for municipalities, industries, agriculture and the environment is reliable".

Specifically, this chapter presents supply and demand comparisons in five-year increments to 2035 under normal, dry year, and multiple dry year conditions. Information in this chapter is intended to satisfy the requirements related to DWR 2010 UWMP Checklist items 22, 33, and 53. The potential threats to water supply reliability, and how the District works to address and manage these threats, is discussed in Chapter 9.

10.1 Water Supply Modeling

The District uses the Water Evaluation and Planning (WEAP) system model. This water supply modeling tool takes an integrated approach to water resources planning. The WEAP model is used primarily to simulate the District's water supply system comprised of facilities to recharge the county's groundwater basins, local water systems including the operation of reservoirs and creeks, treatment and distribution facilities, and raw water conveyance systems. The model also accounts for non-District sources and distribution of water in Santa Clara County such as imported water from the San Francisco Public Utilities Commission (SFPUC), recycled water, and local water developed by other agencies such as San Jose Water Company's Lake Elsman. In essence, the model was formulated to simulate the total management of the current and future water resources within Santa Clara County. In addition, the District groundwater flow models were used to estimate groundwater storage, effective natural groundwater yield, and basin losses and exchanges.

10.1.1 Modeling Assumptions

Analyzing projected water supplies and demands requires a number of technical assumptions. These modeling assumptions are summarized in the sections below and a comparison of all modeling assumptions used for the 2005 and 2010 UWMP is included in Appendix N.

10.1.1.1 Initial Conditions

Initial conditions for the local reservoirs and the groundwater basins are set to the actual storage at the beginning of 2010. The Semitropic Water Bank initial storage was 218,500 AF, which also corresponds to the actual storage at the beginning of 2010.

10.1.1.2 Hydrologic Sequence

The historical hydrology used for this analysis spans from 1922 through 2003. This hydrologic sequence was selected to be consistent with the Department of Water Resources (DWR) "State Water Project Delivery Reliability Report 2009" and associated CALSIM II modeling results. The range of hydrologic conditions in this DWR report are based on the historical flow record and represent the possible range of water supply conditions. Detailed hydrologic data for the District only exists from 1967 forward. Data since 1967 is actual stream gage data developed by District staff. Data prior to 1967 is generated by rainfall data correlated to the available gauged data.

10.1.1.3 Imported Water

State Water Project (SWP) and Central Valley Project (CVP) imported supplies are based on the "State Water Project Delivery Reliability Report 2009" and associated CALSIM II modeling results for hydrologic years of 1922 through 2003 with 2029 demands, level of development, and climate change. CalSim II is a computer model jointly developed by DWR and the U.S. Bureau of Reclamation. This model simulates much of the water resource infrastructure in the Central Valley and Delta region of California and models all areas that contribute flow to the Delta.

Note that the modeling analysis assumes no additional imported supplies are secured through water transfers or exchanges. The model uses the District's current Semitropic Water Bank participation level of 350,000 AF.

San Francisco Public Utilities Commission (SFPUC) Hetch-Hetchy supplies are based on Interim Supply Allocations adopted by SFPUC in December 2010, Procedure for Pro-Rata Reduction of Wholesale Customers' Individual Supply Guarantees under 2010 demand conditions, and Tier 2 Allocations calculation spreadsheet. Under normal conditions, SFPUC supplies for the county through 2018 are 65,500 AF per year and 63,850 AF per year after 2018.

10.1.1.4 Groundwater

The Santa Clara Plain and the Coyote Valley operational storages are assumed to be 350,000 AF and 25,000 AF, respectively. The operational storage capacity of the Llagas Subbasin is assumed to be 155,000 AF. Therefore the total combined operational groundwater storage capacity for the county for modeling purposes is 530,000 AF. A maximum pumping limit of 200,000 AF per year is used for the Santa Clara Plain and it is assumed that subsidence would occur in the Santa Clara Plain if pumping exceeds this maximum. For modeling purposes, recharge can only take place up to the maximum operational storage and supplies to meet demands are unavailable once the operational storage is depleted. Note that the actual amount of water that can be pumped is highly dependent on how the subbasin is managed, recent hydrology, and the amount of natural and artificial recharge that takes place.

10.1.1.5 Recycled Water

Recycled water projections are based on estimates provided by county recycled water producers and water retailers. See Chapter 7 for more information on recycled water.

10.1.1.6 Demand and Conservation

The analysis presented here is based on updated demand projections provided by the majority of the water retailers in the county. Demand projections for Great Oaks Water Company are from District projections based on ABAG Projections 2009, calibrated with actual use data. Demands for independent groundwater pumpers were assumed to continue at the same level observed in the historical use record. Total demands in five-year increments by retailer from 2015 to 2035 are presented in Chapter 4.

The analysis in this chapter does not include increases in demand associated with dry years. Preliminary estimates suggest that dry year demands (before any voluntary or mandatory conservation) could be approximately five to seven percent higher for M&I and up to 20 percent higher for agricultural use than those shown in the figures and tables included in this chapter. However, these estimates were not included because dry-year demand increases are highly dependent on the timing of precipitation and other weather factors.

10.2 Supply and Demand Comparison

10.2.1 Wet Year Supply

Wet year supplies are an important component of the District total supply as surplus supplies are stored for use during drought periods. Supplies in excess of demand can be stored in the groundwater basin, carried over in local reservoirs or San Luis Reservoir, and banked outside the county in Semitropic Water Bank located northwest of Bakersfield. This operational strategy is limited by groundwater basin recharge capacity, distribution system capacity, and various contractual and infrastructure restrictions. Wet-year rainfall can be twice that of an average year but not all of that water can be captured as usable supply. The wettest year on record is 1983 with nearly 33 inches of rain on the valley floor as measured at rain gage 86 near the airport and downtown San Jose.

10.2.2 Normal Year Supply

The "normal" year for the purposes of the report is a year in the historical sequence that most closely represents median runoff levels and patterns. In dry and multiple dry year analysis, the use of groundwater reserves and any indicated shortage is highly dependent on the assumed initial groundwater storage at the beginning of the run and leading into the dry year period under analysis.

The normal year analysis presented here uses a specific year to approximate supplies available on an annual basis excluding carryover storage. Carryover storage is that portion of local and outside of the county surface storage, local groundwater storage, and outside the county banked storage that is not required to meet this year's demands but could potentially be utilized in subsequent years. Note that groundwater is used in all year types (including years where the total supplies exceed total demands) for distribution, storage and treatment.

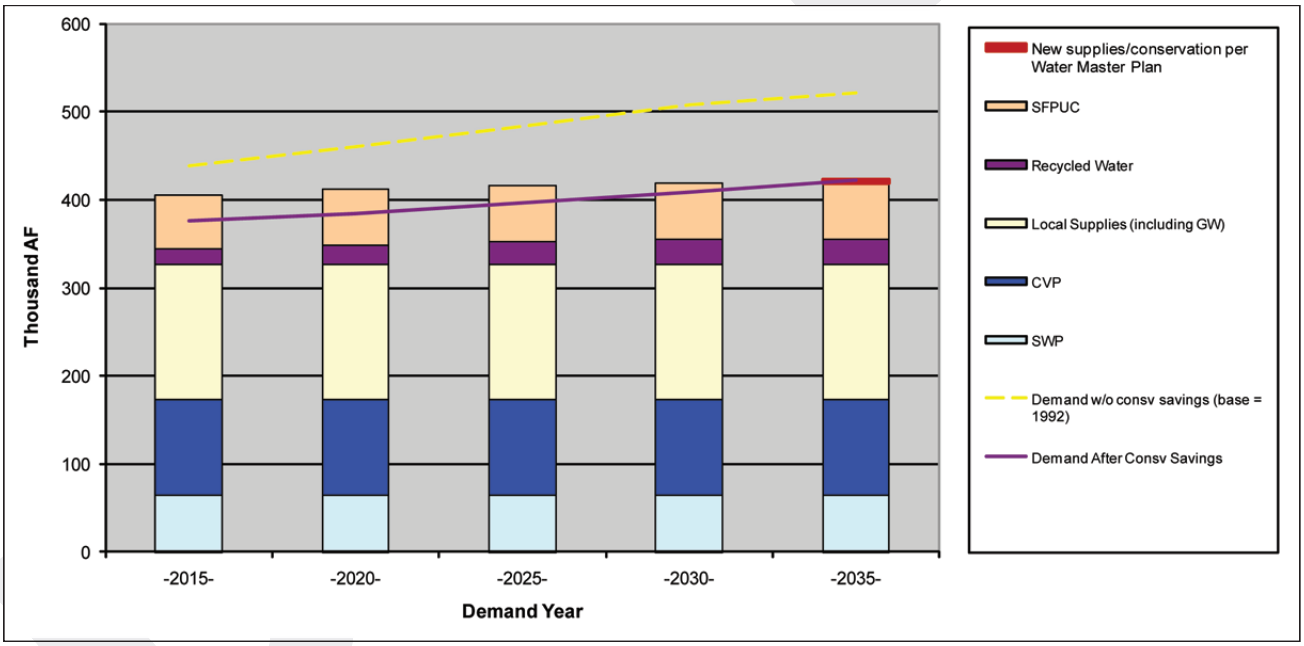
Evaluating the system without carryover storage (even though demands in a future average year could be satisfied with these supplies) gives a good indication of the sustainability of the system and identifies the potential need for new supplies.

Based on an evaluation of total supplies available to the District over the historical hydrologic sequence (1922 through 2003), and given current existing facilities and institutional arrangements, the median and average are within approximately 1 percent. The average supplies available over this period are 402,000 AF and the median is 405,000 AF under 2015 conditions. The median year from the analysis of the historical hydrologic sequence is 1935. However, 2002 was selected as the "normal year" because it is close to the median, essentially equal to the average and falls within the period after 1967 where actual rather than correlated data is available. The selection of a "normal year" does not match the average year for all supply sources, but is the "best fit" for the hydrologic years included in the modeling analysis. Total supplies for 2002 are 405,000 AF in the year 2015.

Figure 10-1 and Table 10-2 shows the supply and demand comparison for the normal year in bar chart and tabulated values, respectively.

Based on Figure 10-1 and Table 10-1, anticipated total supplies under 2015 demands (excluding carryover supplies) are approximately 405,580 AF under normal year hydrologic conditions. This compares to estimated total county demand of 375,720 AF in 2015. Therefore, in this example supplies exceed demand and there is no need to dip into carryover storage.

Figure 10-1 Supply and Demand Comparison, Normal Year – 2002 (AF)



Notes:
(1) SWP and CVP supplies based on State Water Project Delivery Reliability Report 2009 and associated CALSIM II Modeling Results under 2029 demand conditions with climate change.
(2) Assumes no additional imported supplies are secured through transver, spot market or options.
(3) Includes Department of Safety of Dams interim reservoir operations restrictions for Almaden, Anderson, Calero, Coyote and Guadalupe. Assumes repairs to Anderson will be completed and reservoir may be operated at full capacity starting in 2025.
(4) Recycled water projections based on estimates provided by county recycled water producers and retailers. See Chapter 7 for more information.
(5) SFPUC supplies based on Interim Supply Allocations adopted by SFPUC in December 2010 through 2018 and SFPUC Individual supply guarantees (ISGs) after 2018.
(6) Demands after conservation savings are based on projections from water retailers and include water conservation program water savings goal for both urban and agricultural conservation. See Chapter 4 and Chapter 5 for more information on demand projections and the water conservation program respectively.

Table 10-1 Supply and Demand Comparison, Normal Year – 2002 (AF)

Source	Demand Year				
	2015	2020	2025	2030	2035
SWP(1),(2)	64,000	64,000	64,000	64,000	64,000
CVP(1),(2)	108,100	108,100	108,100	108,100	108,100
Local Supplies(3)	145,020	145,020	153,800	153,800	153,800
Recycled Water(4)	18,680	22,280	25,780	29,180	29,380
SFPUC(5)	61,000	63,700	63,850	63,850	63,850
New supplies/conservation per Water Master Plan	0	0	0	0	3,790
Total Supplies	**396,800**	**403,100**	**415,530**	**418,930**	**422,920**
Demand before Conservation Savings (1992 base year)	438,820	460,910	483,120	507,870	521,420
Demand after Conservation Savings(6)	**375,720**	**384,810**	**396,420**	**409,370**	**422,920**

Notes:
(1) SWP and CVP supplies based on State Water Project Delivery Reliability Report 2009 and associated CALSIM II Modeling Results under 2029 demand conditions with climate change.
(2) Assumes no additional imported supplies are secured through transfer, spot market or options.
(3) Includes Department of Safety of Dams interim reservoir operations restrictions for Almaden, Anderson, Calero, Coyote and Guadalupe. Assumes repairs to Anderson will be completed and reservoir may be operated at full capacity starting in 2025.
(4) Recycled water projections based on estimates provided by county recycled water producers and retailers. See Chapter 7 for more information.
(5) SFPUC supplies based on Interim Supply Allocations adopted by SFPUC in December 2010 through 2018 and SFPUC Individual supply guarantees (ISGs) after 2018.
(6) Demands after conservation savings are based on projections from water retailers and include water conservation program water savings goal for both urban and agricultural conservation. See Chapter 4 and Chapter 5 for more information on demand projections and the water conservation program, respectively.

However, as demands continue to increase at a rate faster than currently projected new supplies and conservation, total normal year supplies (excluding carryover supplies) begin to fall below demand. As tabulated in Table 10-1, demands in the year 2035 exceed currently projected supplies by approximately 3,800 AF. Based on this analysis, additional supplies, and/or additional conservation are required prior to 2035 in order to meet demands. The identified shortages could be met with carryover supplies, but the District's water supply strategy is to have carryover supplies available for dry year periods. Without new supplies and infrastructure or a corresponding reduction in projected demands, carryover supplies would increasingly be depleted with time and less supply would be available during dry and multiple dry year periods.

10.2.3 Single Dry Year Supply

The single dry year supply is defined as the year with the minimum usable supply. The hydrology of 1977 represents the minimum total supply that has been observed in the historical record. District supplies and demands in five-year increments from 2015 through 2035 for the dry year are shown in Table 10-2.

As shown in Table 10-2, under the modeling conditions and assumptions described earlier in this chapter the District will be able to meet the water needs of the county during the single dry year even with increasing demands. However, supplies can meet only 95 percent of the estimated treated water contracts in 2030 and 2035. A reduction of between 15 and 20 percent in estimated contract treated water deliveries is indicated for the years 2015, 2020 and 2025. It is assumed in this analysis that projects to be identified in Water Supply and Infrastructure Master Plan (Water Master Plan) would be implemented prior to 2030 and would address reductions in treated water deliveries.

Also note that this analysis is based on the historical hydrologic sequence and under these conditions, carryover supplies are available leading into the single dry year. If a similar dry year occurred when this carryover storage was not available, implementation of actions associated with the water shortage contingency plan as described in Chapter 6 would be required.

In the single dry year analysis, supplies from carryover storage (Semitropic and groundwater reserves) are needed to meet the annual demands under all demand years and make up nearly half of the total supplies in the single dry year. The District's ability to take water from the Semitropic Water Bank is, in part, proportional to SWP allocation percentages for the year. During drought years, this can significantly limit how much of its water bank balance the District can withdraw.

10.2.4 Multiple Dry Year Supply

Multiple dry year scenario analysis is particularly useful in the evaluation of carryover storage. Evaluating the availability of the county's water supplies requires an understanding of the driest periods that can reasonably be expected to occur. Over the more than 120 years of recorded rainfall, seven major drought events have occurred. District modeling results indicate that the County's water supply system is more vulnerable to successive dry years, such as those that occurred in 1928 through 1934 and in 1987 through 1992. Multiple dry year periods deplete water storage reserves in local and imported supply reservoirs and in the groundwater subbasins. Multiple dry years pose the greatest challenge to the District's water supply. Although the supply in each year may be greater than in a single very dry year, as a drought lingers storage reserves are relied on more and more.

The multiple dry year period selected for this analysis is from 1987 through 1992. Table 10-3 shows the average annual supplies available during this six-year multiple dry year period under projected demands for 2030 through 2035 and shows the impacts on carryover storage without the implementation of water shortage contingency plan actions. Without the development of new supplies, under these conditions an average of

Table 10-2 Supply and Demand Comparison, Single Dry Year – 1977 (AF)

Source	Demand Year				
	2015	2020	2025	2030	2035
SWP & Semitropic[(1), (2)]	42,500	42,500	42,500	42,500	42,500
CVP[(1), (2)]	69,200	69,200	69,200	69,200	69,200
Local Supplies[(3)]	63,600	63,600	63,600	63,600	63,600
Recycled Water[(4)]	18,680	22,280	25,780	29,180	29,380
SFPUC[(5)]	52,600	50,950	50,950	50,950	50,950
Groundwater Reserves and Surface Carryover Supplies	129,140	136,280	144,390	153,940	167,290
Total Supplies	**375,720**	**384,810**	**396,420**	**409,370**	**422,920**
Demand before Conservation Savings (base = 1992)	438,820	460,910	483,120	507,870	521,420
Demand after Conservation Savings	**375,720**	**384,810**	**396,420**	**409,370**	**422,920**

Notes:
(1) SWP and CVP supplies based on State Water Project Delivery Reliability Report 2009 and associated CALSIM II Modeling Results under 2029 demand conditions with climate change. Includes Semitropic participation level of 350,000 AF.
(2) Assumes no additional imported supplies are secured through transfer, spot market or options.
(3) Includes Department of Safety of Dams interim reservoir operations restrictions for Almaden, Anderson, Calero, Coyote and Guadalupe. Assumes repairs to Anderson will be completed and reservoir may be operated at full capacity starting in 2025.
(4) Recycled water projections based on estimates provided by county recycled water producers and retailers. See Chapter 7 for more information.
(5) SFPUC supplies based on Interim Supply Allocations adopted by SFPUC in December 2010 through 2018 and SFPUC Individual supply guarantees (ISGs) after 2018, Procedure for Pro-Rata Reduction of Wholesale Customers' Individual Supply Guarantees under 2010 demand conditions, and Tier Two Allocations calculation spreadsheet provided by BAWSCA.
(6) Demands after conservation savings are based on projections from water retailers and include water conservation program water savings goal for both urban and agricultural conservation. See Chapter 4 and Chapter 5 for more information on demand projections and the water conservation program, respectively.

113,500 AF per year of carryover storage and short-term demand reductions would be required.

Table 10-4 shows the average annual supplies in five-year increments available to the District over the six-year multiple dry period under 2015 through 2035 demand conditions. The volume of groundwater reserves and surface carryover supplies shown is the average annual reduction for the six-year multiple dry year period.

In this analysis, supplies from carryover storage are needed to meet the annual demands under all demand scenarios and demand reductions are indicated for all demand years in the late stages of the multiple year drought. Note that projected demand reductions after the year 2025 would exceed 20 percent with the existing level of supplies and storage.

Table 10-3 Annual Supplies and Projected Demand for Multiple Dry Years

Year	Hydrologic Year	Total Annual Supplies (AF)(1)	Demand Year	Projected Demands(2)	Carryover Impact and/or needed WSCP actions (AF)
1	1987	345,000	2030	409,370	64,370
2	1988	254,000	2031	412,080	158,080
3	1989	334,000	2032	414,790	80,790
4	1990	239,000	2033	417,500	178,500
5	1991	308,000	2034	420,210	112,210
6	1992	336,000	2035	422,920	86,920

Notes:
(1) Does not include any new supplies as these will be developed and evaluated in the Water Master Plan. Assumes no actions are taken to secure additional supplies (purchases/exchanges/transfers) and excludes all carryover storage.
(2) Does not include short-term behavioral demand reductions associated with water shortage contingency plan actions.

Table 10-4 Supply and Demand Comparison, Multiple Dry Year Average 1987 – 1992 (AF)

Source	Demand Year				
	2015	2020	2025	2030	2035
SWP & Semitropic(1),(2)	60,500	60,500	60,500	60,500	60,500
CVP(1),(2)	80,270	80,270	80,270	80,270	80,270
Local Supplies(3)	102,300	102,300	102,300	102,300	102,300
Recycled Water(4)	18,680	22,280	25,780	29,180	29,380
SFPUC(5)	50,150	48,500	48,500	48,500	48,500
Groundwater Reserves and Surface Carryover Supplies	51,300	51,750	50,250	68,150	66,750
Total Supplies	**363,200**	**365,600**	**367,600**	**388,900**	**387,700**
Demand before Conservation Savings (base = 1992)	438,820	460,910	483,120	507,870	521,420
Demand after Long-term Conservation Savings(6)	375,720	384,810	396,420	409,370	422,920
Demand After Short-term Conservation Savings(7)	**363,200**	**365,600**	**367,600**	**388,900**	**387,700**

Notes:
(1) SWP and CVP supplies based on State Water Project Delivery Reliability Report 2009 and associated CALSIM II Modeling Results under 2029 demand conditions with climate change. Includes Semitropic participation level of 350,000 AF.
(2) Assumes no additional imported supplies are secured through transfer, spot market or options.
(3) Includes Department of Safety of Dams interim reservoir operations restrictions for Almaden, Anderson, Calero, Coyote and Guadalupe. Assumes repairs to Anderson will be completed and reservoir may be operated at full capacity starting in 2025.
(4) Recycled water projections based on estimates provided by county recycled water producers and retailers. See Chapter 7 for more information.
(5) SFPUC supplies based on Interim Supply Allocations adopted by SFPUC in December 2010 through 2018 and SFPUC Individual supply guarantees (ISGs) after 2018, Procedure for Pro-Rata Reduction of Wholesale Customers' Individual Supply Guarantees under 2010 demand conditions, and Tier Two Allocations calculation spreadsheet provided by BAWSCA.
(6) Demands after conservation savings are based on projections from water retailers and include water conservation program water savings goal for both urban and agricultural conservation. See Chapter 4 and Chapter 5 for more information on demand projections and the water conservation program, respectively.
(7) Includes individual year demand reductions as summarized in Table 10-5.

As described in Chapter 6 on Water Shortage Contingency Planning, the timing and stages of shortage actions are designed to limit and avoid having to call for more than a 20 percent reduction in water use in any given year to minimize economic, social, and environmental hardships to the community. The Water Master Plan will further evaluate this maximum reduction and it may be lowered depending on the benefit cost analysis to be performed as part of the project. Therefore at this time a 20 percent maximum reduction is assumed for this plan. Table 10-4 assumes a maximum demand reduction of 20 percent. Without new supplies or a corresponding reduction in projected demands, shortages and calls for short-term conservation above 20 percent would increase in frequency and magnitude with time.

As shown in the normal year analysis, sometime after 2030 average supplies fall below demands which results in the depletion of carryover storage even before drought conditions are encountered. Table 10-4 assumes a maximum demand reduction of 20 percent. Without new supplies, adequate carryover storage might not be available during the multiple year droughts and greater than 20 percent short-term conservation could be required. In addition, if the historical sequence is not representative of future hydrologic conditions, then shortages of larger magnitude and longer duration could result.

10.3 Water Supply and Infrastructure Master Plan

The District's existing and planned water supplies and infrastructure will continue to meet most of the county's needs in the future. However, supplies and infrastructure need to be expanded or supplemented to meet new demands. Additional supplies and related infrastructure required to bridge the identified difference between supplies and demands will be established in the Water Supply and Infrastructure Master Plan (Water Master Plan). Potential supply options available to the District will be evaluated in the Water Master Plan and include recycled water, increased conservation, additional imported supplies including exchanges, transfers and options, desalination, and new storage.

The Water Master Plan will be the District's plan for meeting Santa Clara County's future water demands and will include a program of proposed water supply and infrastructure projects to meet the county's water needs after 2025.

10.4 Supply and Demand Comparison Summary

A sustainable, high-quality water supply is vital for a prosperous economy, the environment, and quality of life in Santa Clara County. Water supply issues in California are shaped by periodic droughts and increasing competition for water. Population growth and competition among urban development, agriculture, and environmental water needs all place increasing demands on this limited resource. Today's challenges revolve around balancing finite and variable water supplies, especially during prolonged drought periods. Now more than ever, water managers like the District must carefully plan for future needs while efficiently managing existing supplies, finding innovative and technical solutions to mounting costs, and protecting the environment.

A number of District activities and programs described in detail in Chapter 3 have improved and continue to maintain the reliability of District supplies, and to reduce the District's exposure to hydrologic uncertainty and other risks. Specifically, the banking and transfer agreements help increase District water supplies in years of shortage as do District programs aimed at maintaining adequate levels of groundwater storage. Recycled water projects provide a water supply source that is largely independent of hydrology. The strategy described in Chapter 6 guides District actions in years of water supply shortage, including those more severe than the single and multiple dry years which may be observed in the future. Table 10-5 summarizes the required short-term demand reductions in five-year increments for dry and multiple dry year periods based on the modeling analysis performed for this plan.

Modeling results, based on an evaluation of total supplies available to the District over the historical hydrologic sequence with current existing facilities and institutional arrangements, indicate that the District cannot meet total projected demands after 2025 without the implementation of overly restrictive water shortage action unless additional supplies are secured. The forthcoming Water Master Plan will identify and further quantify the needed supplies and required infrastructure.

Table 10-5 Projected Short-term Demand Reduction Summary[1]

Demand Year	Single Dry Year (1977)	Multiple Dry Years (1987 – 1992)					
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
2015	0%	0%	0%	0%	0%[3]	10%	10%
2020	0%[2]	0%	0%	0%	0%[3]	10%	20%
2025	0%[2]	0%	0%	0%	0%[3]	10%	20%
2030[4]	0%	0%	0%	0%	0%	0-10%	0-20%
2035[4]	0%	0%	0%	0%	0-10%	0-20%	0-20%

Notes:
(1) Projected demand reductions are based on the modeling analysis performed for the 2010 UWMP with the implementation of water shortage contingency planning stages as summarized in Chapter 6.
(2) Total county wide demand can be met through treated water, groundwater, recycled water and SFPUC supplies. However, can meet only 95% of the estimated treated water contract amount in 2020 and 2025.
(3) Total county wide demand can be met through treated water, groundwater, recycled water and SFPUC supplies. However, a reduction of between 15 -20% in estimated contract treated water deliveries is indicated by the modeling results for the years 2015, 2020 and 2025.
(4) These values assume the implementation of projects to be identified in Water Supply and Infrastructure Master Plan (Water Master Plan) prior to 2030. Note that projected demand reductions after the year 2025 would exceed 20% with the existing level of supplies and storage. This is outside the 0 - 20% target level identified as a planning constraint for the Water Supply and Infrastructure Master Plan (Water Master Plan). The appropriate target level of demand reductions after 2025 within the 0-20% range will be evaluated as part of the Water Master Plan benefit cost analysis work.